

NATIONAL ADVISORY  
COMMITTEE FOR  
AERONAUTICS

INDEX OF NACA TECHNICAL PUBLICATIONS

June, 1954 - May, 1955



WASHINGTON - 1955

## PREFACE

This Index of NACA Technical Publications covers those NACA research reports issued in the period of June 1954 through May 1955. It is the fourth supplement to the basic 1915-1949 Index.

The research reports issued prior to June 1954 which have been declassified since that date have also been included. In addition, current announcement of newly declassified materials is regularly made in the NACA Research Abstracts.

The arrangement of the present Index follows that of its predecessors: (1) A classified listing of the subject categories, (2) a chronological listing of the NACA research reports under each subject category, (3) an alphabetical index to the subject categories, and (4) an author index. An Explanatory Chart on page iii may be helpful in identifying references to NACA research reports encountered in the literature.

Entries included herein duplicate in part the information of the index cards furnished with the individual research reports. Recipients maintaining card files may care to discard those index cards on hand for unclassified research reports issued during the June 1954 - May 1955 period.

Newly available research reports are currently announced in the NACA Research Abstracts and are normally available for a period of five years after announcement. Older research reports (those issued prior to May 1950) are thus available on a "loan only" basis within the United States. Requests for NACA research reports should be forwarded to the address given below.

Division of Research Information  
National Advisory Committee for Aeronautics  
1512 H Street, N. W.  
Washington 25, D. C.

November 1, 1955



EXPLANATORY CHART OF NACA PUBLICATIONS SERIES  
DESIGNATIONS

PUBLICATIONS SERIES	SYMBOL	CURRENTLY ISSUED	NUMBERED CONSECUTIVELY	NUMBER BASED ON LABORATORY** OF ORIGIN	NUMBER BASED ON DATE OF ISSUE- YEAR* MONTH# DAY###	EXAMPLE WITH EXPLANATION
Reports	None	Yes	Yes	No	No	Report 1004 - 1004th Report issued.
Research Memorandums	RM	Yes	No	Yes	Yes	RM L9K03a - Research Memorandum written by Langley Laboratory Personnel in 1949 and issued on November 3rd, being the second RM released on that date.
Technical Memorandums	TM	Yes	Yes	No	No	TM 1313 - 1313th Technical Memorandum issued.
Technical Notes	TN	Yes	Yes	No	No	TN 2432 - 2432nd Technical Note issued.
Wartime Reports	WR	No	Yes	Yes	No	WR A-6 - 6th Wartime Report issued that was based on Ames Laboratory research. Reported earlier to a limited audience and was reprinted.
Adv. Conf. Reports	ACR	No	No	Yes, after March, 1944##	Yes, after April, 1943##	ACR E4D19 - Advance Confidential Report written by Lewis Laboratory personnel in 1944 and issued on April 19th.
Adv. Rest'd. Reports	ARR	No	No	Yes, after March, 1944##	Yes, after April, 1943##	ARR L4K22b - Advance Restricted Report written by Langley Laboratory personnel in 1944 and issued on November 22nd, being the 3rd ARR issued on that date.
Conf. Bulletins	CB	No	No	Yes, after March, 1944##	Yes, after April, 1943##	CB E5J11 - Confidential Bulletin written by Lewis Laboratory personnel in 1945 and issued October 11th.
Memorandum Reports	MR	No	No	Yes, after October, 1944##	Yes, after October, 1944##	MR A4L12 - Memorandum Report written by Ames Laboratory personnel in 1944 and issued on December 12th.
Restricted Bulletins	RB	No	No	Yes, after March, 1944##	Yes, after April, 1943##	RB E6D22 - Restricted Bulletin written by Lewis Laboratory personnel in 1946 and issued on April 22nd.
Aircraft Circulars	AC	No	Yes	No	No	AC 150 - 150th Aircraft Circular issued.

## Symbol and date only  
used prior to date  
mentioned.

\*\* A - Ames  
E - Lewis  
L - Langley

\* 5 - 1945  
6 - 1946  
7 - 1947  
8 - 1948  
9 - 1949

50 - 1950  
51 - 1951  
52 - 1952

# A - January  
B - February  
C - March  
D - April  
E - May  
F - June

G - July  
H - August  
I - September  
J - October  
K - November  
L - December

### 01  
02  
03 . . etc. to 31 followed by  
a - 2nd document issued that date  
b - 3rd document issued that date

Subject Heading Number	Subject Heading Outline	Subject Heading Number	Subject Heading Outline
1	AERODYNAMICS	1.2.2.7	Wake
1.1	Fundamental Aerodynamics	1.2.2.8	Boundary Layer
1.1.1	Incompressible Flow	1.2.2.8.1	Characteristics
1.1.2	Compressible Flow	1.2.2.8.2	Control
1.1.2.1	Subsonic Flow	1.3	Bodies
1.1.2.2	Mixed Flow	1.3.1	Theory
1.1.2.3	Supersonic Flow	1.3.2	Shape Variables
1.1.3	Viscous Flow	1.3.2.1	Fineness Ratio
1.1.3.1	Laminar Flow	1.3.2.2	Cross Section
1.1.3.2	Turbulent Flow	1.3.2.3	Thickness Distribution
1.1.3.3	Jet Mixing	1.3.2.4	Surface Conditions
1.1.4	Aerodynamics With Heat	1.3.2.5	Protuberances
1.1.4.1	Heating	1.3.3	Canopies
1.1.4.2	Heat Transfer	1.3.4	Ducted Bodies
1.1.4.3	Additions of Heat	1.3.4.1	Nose Shape
1.1.5	Flow of Rarefied Gases	1.3.4.3	Side Inlets
		1.3.4.4	Side Exits
1.2	Wings	1.3.5	Hulls
1.2.1	Wing Sections	1.4	Internal Aerodynamics
1.2.1.1	Section Theory	1.4.1	Air Inlets
1.2.1.2	Section Variables	1.4.1.1	Nose, Central
1.2.1.2.1	Camber	1.4.1.1.1	Propeller-Spinner-Cowl Combinations
1.2.1.2.2	Thickness	1.4.1.1.2	Subsonic
1.2.1.2.3	Thickness Distribution	1.4.1.1.3	Supersonic
1.2.1.2.4	Inlets and Exits	1.4.1.2	Nose, Annular
1.2.1.2.5	Surface Conditions	1.4.1.3	Wing Leading Edge
1.2.1.3	Designated Profiles	1.4.1.4	Side
1.2.1.4	High-Lift Devices	1.4.1.4.1	Scoops
1.2.1.4.1	Plain Flaps	1.4.1.4.2	Submerged
1.2.1.4.2	Split Flaps	1.4.2	Ducts
1.2.1.4.4	Leading-Edge Flaps	1.4.2.1	Diffusers
1.2.1.5	Controls	1.4.2.1.1	Subsonic
1.2.1.5.1	Flap Type	1.4.2.1.2	Supersonic
1.2.1.5.2	Spoilers	1.4.2.2	Nozzles
1.2.1.6	Boundary Layer	1.4.2.3	Pipes
1.2.1.6.1	Characteristics	1.4.2.4	Bends
1.2.1.6.2	Control	1.4.3	Exits
1.2.1.7	Reynolds Number Effects	1.4.4	Jet Pumps and Thrust Augmentors
1.2.1.8	Mach Number Effects	1.4.5	Cascades
1.2.1.9	Wake	1.4.5.1	Theory
1.2.2	Complete Wings	1.4.5.2	Experiment
1.2.2.1	Wing Theory	1.4.7	Boundary Layer
1.2.2.2	Wing Variables	1.4.7.1	Characteristics
1.2.2.2.1	Profiles	1.4.7.2	Control
1.2.2.2.2	Aspect Ratio	1.5	Propellers
1.2.2.2.3	Sweep	1.5.1	Theory
1.2.2.2.4	Taper and Twist	1.5.2	Design Variables
1.2.2.2.6	Surface Conditions	1.5.2.1	Blade Sections
1.2.2.2.7	Dihedral	1.5.2.4	Blade Plan Forms
1.2.2.3	High-Lift Devices	1.5.2.5	Mach Number Effects
1.2.2.3.1	Trailing-Edge Flaps	1.5.2.6	Pusher
1.2.2.3.2	Slots and Slats	1.5.2.7	Dual Rotation
1.2.2.3.3	Leading-Edge Flaps	1.5.2.8	Interference of Bodies
1.2.2.4	Controls	1.5.2.9	Pitch and Yaw
1.2.2.4.1	Flap Type	1.5.3	Designated Types
1.2.2.4.2	Spoilers		
1.2.2.4.3	All-Movable		
1.2.2.5	Reynolds Number Effects		
1.2.2.6	Mach Number Effects		



Subject Heading Number	Subject Heading Outline	Subject Heading Number	Subject Heading Outline
1.5.4	Slipstream	2	HYDRODYNAMICS
1.5.6	Operating Conditions	2.1	Theory
1.5.7	Propeller-Spinner-Cowl Combinations	2.2	General Arrangement Studies
1.6	Rotating Wings	2.3	Seaplane Hull Variables
1.6.1	Theory	2.3.1	Length-Beam Ratio
1.6.2	Experimental Studies	2.3.2	Dead Rise
1.6.2.1	Power-Driven	2.3.3	Steps
1.7	Aircraft	2.3.6	Chines
1.7.1	Airplanes	2.6	Planing Surfaces
1.7.1.1	Components in Combination	2.7	Hydrofoils
1.7.1.1.1	Wing-Fuselage	2.8	Surface Craft
1.7.1.1.2	Wing-Nacelle	2.10	Stability and Control
1.7.1.1.3	Tail-Wing and Fuselage	2.10.1	Longitudinal
1.7.1.1.5	External Stores	3	PROPULSION
1.7.1.2	Specific Airplanes	3.1	Complete Systems
1.7.1.3	Performance	3.1.1	Reciprocating Engines
1.7.2	Missiles	3.1.3	Turbojet Engines
1.7.2.1	Components in Combination	3.1.4	Turbo-Propeller Engines
1.7.2.1.1	Wing-Body	3.1.7	Ram-Jet Engines
1.7.2.1.2	Tail-Body	3.1.8	Rocket Engines
1.7.2.1.3	Jet Interference	3.1.9	Jet-Driven Rotors
1.7.2.1.4	Wing-Tail-Body	3.1.10	Nuclear-Energy Systems
1.7.2.2	Specific Missiles	3.1.12	Comparison of Engine Types
1.7.3	Rotating-Wing Aircraft	3.2	Control of Engines
1.7.3.1	Autogiros	3.2.2	Control of Turbojet Engines
1.7.3.2	Helicopters	3.2.3	Control of Turbine-Ram-Jet Engines
1.7.4	Seaplanes	3.2.4	Control of Turbine-Propeller Engines
1.7.4.1	General Studies	3.3	Auxiliary Booster Systems
1.8	Stability and Control	3.3.2	Gas Turbines
1.8.1	Stability	3.3.2.1	Liquid Injection
1.8.1.1	Static	3.3.2.2	Afterburning
1.8.1.1.1	Longitudinal	3.4	Fuels
1.8.1.1.2	Lateral	3.4.2	Physical and Chemical Properties
1.8.1.1.3	Directional	3.4.3	Relation to Engine Performance
1.8.1.2	Dynamic	3.4.3.2	Turbine Engines, Ram Jets, and Pulse Jets
1.8.1.2.1	Longitudinal	3.4.3.3	Rockets (Includes Fuel and Oxidant)
1.8.1.2.2	Lateral and Directional	3.5	Combustion and Combustors
1.8.1.2.3	Damping Derivatives	3.5.1	General Combustion Research
1.8.2	Control	3.5.1.1	Laminar-Flow Combustion
1.8.2.1	Longitudinal	3.5.1.2	Turbulent-Flow Combustion
1.8.2.2	Lateral	3.5.1.4	Effects of Fuel Atomization
1.8.2.3	Directional	3.5.1.5	Reaction Mechanisms
1.8.2.4	Air Brakes	3.5.1.6	Ignition of Gases
1.8.2.5	Hinge Moments	3.5.2	Effect of Engine Operating Conditions and Combustion Chamber Geometry
1.8.2.6	Automatic	3.5.2.2	Turbine Engines
1.8.3	Spinning		
1.8.4	Stalling		
1.8.5	Flying Qualities		
1.8.6	Mass and Gyroscopic Problems		
1.8.7	Tumbling		
1.8.8	Automatic Stabilization		
1.9	Aeroelasticity		
1.10	Parachutes		

Subject Heading Number	Subject Heading Outline	Subject Heading Number	Subject Heading Outline
3.5.2.3	Ram-Jet Engines	4	AIRCRAFT LOADS AND CONSTRUCTION
3.5.2.5	Rocket Engines		
3.6	Compression and Compressors	4.1	Loads
3.6.1	Flow Theory and Experiment	4.1.1	Aerodynamic
3.6.1.1	Axial Flow	4.1.1.1	Wings
3.6.1.2	Radial Flow	4.1.1.1.1	Steady Loads
3.6.1.3	Mixed Flow	4.1.1.1.2	Maneuvering
3.6.2	Stress and Vibration	4.1.1.1.3	Gust Loads
3.6.3	Matching	4.1.1.2	Tail
		4.1.1.2.1	Steady Loads
		4.1.1.2.2	Maneuvering
3.7	Turbines	4.1.1.2.3	Buffeting and Gust
3.7.1	Flow Theory and Experiment	4.1.1.3	Fuselage, Nacelles, and Canopies
3.7.1.1	Axial Flow		Rotating Wings
3.7.1.2	Radial Flow	4.1.1.4	Aeroelasticity
3.7.2	Cooling	4.1.1.5	Landing
3.7.3	Stress and Vibration	4.1.2	Impact
3.7.4	Matching	4.1.2.1	Land
		4.1.2.1.1	Water
		4.1.2.1.2	Ground-Run
3.8	Friction and Lubrication	4.1.2.2	Land
3.8.1	Theory and Experiment	4.1.2.2.1	Prelanding Conditions
3.8.1.1	Hydrodynamic Theory	4.1.2.3	
3.8.1.2	Chemistry of Lubrication		
3.8.1.3	Surface Conditions	4.2	Vibration and Flutter
3.8.2	Sliding Contact Surfaces	4.2.1	Wings and Ailerons
3.8.2.1	Sleeve Bearings	4.2.2	Tails
3.8.3	Rolling Contact Surfaces	4.2.2.1	Elevators and Rudders
3.8.3.1	Antifriction Bearings	4.2.3	Bodies
3.8.4	Sliding and Rolling Contact Surfaces	4.2.4	Propeller, Fans, and Compressors
3.8.5	Lubricants	4.2.5	Rotating-Wing Aircraft
3.9	Heat Transfer	4.3	Structures
3.9.1	Theory and Experiment	4.3.1	Columns
3.9.2	Heat Exchangers	4.3.2	Frames, Gridworks, and Trusses
			Plates
3.10	Cooling of Engines	4.3.3	Flat
3.10.2	Gas-Turbine Systems	4.3.3.1	Unstiffened
3.10.3	Ram Jets	4.3.3.1.1	Stiffened
		4.3.3.1.2	Curved
		4.3.3.2	Unstiffened
3.11	Properties of Gases	4.3.3.2.1	
3.11.1	Kinetic	4.3.4	Beams
3.11.2	Thermodynamic	4.3.4.1	Box
		4.3.5	Shells
		4.3.5.1	Cylinders
3.12	Accessories and Accessory Functions	4.3.5.1.1	Circular
3.12.1	Fuel Systems	4.3.6	Connections
3.12.1.8	Rocket Engines	4.3.6.1	Bolted
3.12.2	Ignition Systems	4.3.6.2	Riveted
3.12.5	Cooling Systems	4.3.7	Loads and Stresses
		4.3.7.2	Compression
		4.3.7.3	Bending
		4.3.7.4	Torsion
3.13	Vibration and Flutter	4.3.7.5	Shear



<u>Subject Heading Number</u>	<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>	<u>Subject Heading Outline</u>
4.3.7.6	Concentrated	7	OPERATING PROBLEMS
4.3.7.7	Dynamic	7.1	Safety
4.3.7.7.1	Repeated	7.1.1	Pilot-Escape Techniques
4.3.7.7.2	Transient	7.3	Ice Prevention and Removal
4.3.7.8	Normal Pressures	7.3.2	Propellers
5	MATERIALS	7.3.3	Wings and Tails
5.1	Types	7.3.4	Windshields
5.1.1	Aluminum	7.3.5	Miscellaneous Accessories
5.1.3	Steels	7.3.6	Propulsion Systems
5.1.4	Heat-Resisting Alloys	7.4	Noise
5.1.5	Ceramics	7.7	Piloting Techniques
5.1.6	Plastics	7.8	Physiological
5.1.7	Woods	7.9	Fire Hazards
5.1.8	Adhesives	7.10	General
5.1.9	Protective Coatings	8	INSTRUMENTS
5.1.11	Sandwich and Laminates	8.1	Flight
5.1.12	Ceramals	8.2	Laboratory
5.2	Properties	8.3	Meteorological
5.2.1	Tensile	9	RESEARCH EQUIPMENT AND TECHNIQUES
5.2.2	Compressive	9.1	Equipment
5.2.3	Creep	9.1.1	Wind Tunnels
5.2.4	Stress-Rupture	9.1.2	Free-Flight
5.2.5	Fatigue	9.1.4	Propulsion Research Equipment
5.2.6	Shear	9.1.5	Propeller
5.2.7	Flexural	9.1.6	Materials
5.2.8	Corrosion Resistance	9.2	Technique
5.2.9	Structure	9.2.1	Corrections
5.2.11	Thermal	9.2.2	Aerodynamics
5.2.12	Multiaxial Stress	9.2.3	Hydrodynamics
5.2.13	Plasticity	9.2.4	Loads and Construction
5.3	Operating Stresses and Conditions	9.2.5	Propulsion
6	METEOROLOGY	9.2.6	Operating Problems
6.1	Atmosphere	9.2.7	Mathematics
6.1.2	Gusts		
6.1.2.1	Structure		
6.1.2.3	Turbulence		
6.1.2.4	Alleviation		
6.2	Ice Formation		

# **AERODYNAMICS**

## **(1)**



## Fundamental

### (1.1)

A VECTOR STUDY OF LINEARIZED SUPERSONIC FLOW APPLICATIONS TO NONPLANAR PROBLEMS. John C. Martin. 1953. ii, 34p. diags., tab. (NACA Rept. 1143. Formerly TN 2641)

## INCOMPRESSIBLE FLOW

### (1.1.1)

DIRECT MEASUREMENTS OF SKIN FRICTION. Satish Dhawan, California Institute of Technology. 1953. ii, 20p. diags., photos. (NACA Rept. 1121. Formerly TN 2567)

DIFFUSION OF HEAT FROM A LINE SOURCE IN ISOTROPIC TURBULENCE. Mahinder S. Uberoi and Stanley Corrsin, Johns Hopkins University. 1953. ii, 29p. diags., photos., tab. (NACA Rept. 1142. Formerly TN 2710)

AVERAGE SKIN-FRICTION DRAG COEFFICIENTS FROM TANK TESTS OF A PARABOLIC BODY OF REVOLUTION (NACA RM-10). Elmo J. Mottard and J. Dan Loposer. 1954. ii, 7p. diags., photos. (NACA Rept. 1161. Formerly TN 2854)

A NOTE ON SECONDARY FLOW IN ROTATING RADIAL CHANNELS. James J. Kramer and John D. Stanitz. 1954. ii, 12p. diags. (NACA Rept. 1179. Formerly TN 3013)

PRELIMINARY MEASUREMENTS OF TURBULENCE AND TEMPERATURE FLUCTUATIONS BEHIND A HEATED GRID. A. L. Kistler, V. O'Brien and S. Corrsin, Johns Hopkins University. June 1954. 24p. diags., photo. (NACA RM 54D19)

A NEW HODOGRAPH FOR FREE-STREAMLINE THEORY. Anatol Roshko, California Institute of Technology. July 1954. 39p. diags., 3 tabs. (NACA TN 3168)

ON THE DRAG AND SHEDDING FREQUENCY OF TWO-DIMENSIONAL BLUFF BODIES. Anatol Roshko, California Institute of Technology. July 1954. 29p. diags., tab. (NACA TN 3169)

HEAT, MASS, AND MOMENTUM TRANSFER FOR FLOW OVER A FLAT PLATE WITH BLOWING OR SUCTION. H. S. Mickley, R. C. Ross, A. L. Squyers and W. E. Stewart, Massachusetts Institute of Technology. July 1954. ii, 149p. diags., photos., 9 tabs. (NACA TN 3208)

APPLICATION OF TWO-DIMENSIONAL VORTEX THEORY TO THE PREDICTION OF FLOW FIELDS BEHIND WINGS OF WING-BODY COMBINATIONS AT SUBSONIC AND SUPERSONIC SPEEDS. Arthur Wm. Rogers. September 1954. (ii), 91p. diags., photo., 3 tabs. (NACA TN 3227)

SUBSONIC EDGES IN THIN-WING AND SLENDER-BODY THEORY. Milton D. Van Dyke. November 1954. 26p. diags. (NACA TN 3343)

PREDICTION OF LOSSES INDUCED BY ANGLES OF ATTACK IN CASCADES OF SHARP-NOSED BLADES FOR INCOMPRESSIBLE AND SUBSONIC COMPRESSIBLE FLOW. James J. Kramer and John D. Stanitz. January 1955. 45p. diags. (NACA TN 3149)

DESCRIPTION AND ANALYSIS OF A ROCKET-VEHICLE EXPERIMENT ON FLUTTER INVOLVING WING DEFORMATION AND BODY MOTIONS. H. J. Cunningham and R. R. Lundstrom. January 1955. 26p. diags., photos., 2 tabs. (NACA TN 3311. Formerly RM L50129)

INVESTIGATION OF THE TURBULENT BOUNDARY LAYER ON A YAWED FLAT PLATE. Harry Ashkenas and Frederick R. Riddell, Cornell University. April 1955. 57p. diags., photos. (NACA TN 3383)

ANALYTIC DETERMINATION OF THE DISCHARGE COEFFICIENTS OF FLOW NOZZLES. Frederick S. Simmons. April 1955. 15p. diags. (NACA TN 3447)

## COMPRESSIBLE FLOW

### (1.1.2)

EFFECT OF WING SWEEP, TAPER, AND THICKNESS RATIO ON THE TRANSONIC DRAG CHARACTERISTICS OF WING-BODY COMBINATIONS. Jim Rogers Thompson and Charles W. Mathews. December 31, 1948. 29p. diags., photos., 2 tabs. (NACA RM L8K01)

INVESTIGATION OF SOME TURBULENT-BOUNDARY-LAYER VELOCITY PROFILES AT A TUNNEL WALL WITH MACH NUMBERS UP TO 1.2. Marshall P. Tulin and Ray H. Wright. November 9, 1949. 22p. diags. (NACA RM L9H29a)

## AERODYNAMICS

### 2 FUNDAMENTAL (1.1)

#### Compressible Flow (Cont.)

AN 8-FOOT AXISYMMETRICAL FIXED NOZZLE FOR SUBSONIC MACH NUMBERS UP TO 0.99 AND FOR A SUPERSONIC MACH NUMBER OF 1.2. Virgil S. Ritchie, Ray H. Wright and Marshall P. Tulin. February 23, 1950. 52p. diagrs., photos., 2 tabs. (NACA RM L50A03a)

THE PATH AND MOTION OF SCALE MODELS OF JETTISONABLE NOSE SECTIONS AT SUPERSONIC SPEEDS AS DETERMINED FROM AN INVESTIGATION IN THE LANGLEY FREE-FLIGHT APPARATUS. Lawrence J. Gale. May 23, 1950. 35p. diagrs., photos., 2 tabs. (NACA RM L9J13a)

SUMMARY OF RESULTS OBTAINED BY TRANSONIC-BUMP METHOD ON EFFECTS OF PLAN FORM AND THICKNESS OF LIFT AND DRAG CHARACTERISTICS OF WINGS AT TRANSONIC SPEEDS. Edward C. Polhamus. November 1951. 33p. diagrs., tab. (NACA RM L51H30)

FLUTTER INVESTIGATION OF TWO THIN, LOW-ASPECT-RATIO, SWEEPED, SOLID, METAL WINGS IN THE TRANSONIC RANGE BY USE OF A FREE-FALLING BODY. W. T. Lauten, Jr. and Maurice A. Sylvester. February 1952. 12p. diagrs., photo., 2 tabs. (NACA RM L51K28a)

AN ANALYSIS OF BUZZING IN SUPERSONIC RAM JETS BY A MODIFIED ONE-DIMENSIONAL NON-STATIONARY WAVE THEORY. Robert L. Trimpi. March 1952. 72p. diagrs., photos. (NACA RM L52A18)

HEAT TRANSFER AND SKIN FRICTION FOR TURBULENT BOUNDARY LAYERS ON HEATED OR COOLED SURFACES AT HIGH SPEEDS. Coleman duP. Donaldson. October 1952. 20p. diagrs., 3 tabs. (NACA RM L52H04)

DIRECT MEASUREMENTS OF SKIN FRICTION. Satish Dhawan, California Institute of Technology. 1953. ii, 20p. diagrs., photos. (NACA Rept. 1121. Formerly TN 2567)

EQUATIONS, TABLES, AND CHARTS FOR COMPRESSIBLE FLOW. Ames Research Staff. 1953. iii, 69p. diagrs., 25 charts, 2 tabs. (NACA Rept. 1135. Formerly TN 1428)

ON THE APPLICATION OF TRANSONIC SIMILARITY RULES TO WINGS OF FINITE SPAN. John R. Spreiter. 1953. ii, 21p. diagrs. (NACA Rept. 1153. Formerly TN 2726)

A COMPARISON OF THE EXPERIMENTAL SUBSONIC PRESSURE DISTRIBUTIONS ABOUT SEVERAL BODIES OF REVOLUTION WITH PRESSURE DISTRIBUTIONS COMPUTED BY MEANS OF THE LINEARIZED THEORY. Clarence W. Matthews. 1953. ii, 29p. diagrs., tab. (NACA Rept. 1155. Formerly TN 2519; RM L9F28)

A THEORY FOR STABILITY AND BUZZ PULSATION AMPLITUDE IN RAM JETS AND AN EXPERIMENTAL INVESTIGATION INCLUDING SCALE EFFECTS. Robert L. Trimpi. October 1953. 75p. diagrs., photos., 3 tabs. (NACA RM L53G28)

UNSTEADY OBLIQUE INTERACTION OF A SHOCK WAVE WITH A PLANE DISTURBANCE. Franklin K. Moore. 1954. ii, 21p. diagrs. (NACA Rept. 1165. Formerly TN 2879)

SOME POSSIBILITIES OF USING GAS MIXTURES OTHER THAN AIR IN AERODYNAMIC RESEARCH. Dean R. Chapman. August 1954. 48p. diagrs., 4 tabs. (NACA TN 3226)

THE SMALL-DISTURBANCE METHOD FOR FLOW OF A COMPRESSIBLE FLUID WITH VELOCITY POTENTIAL AND STREAM FUNCTION AS INDEPENDENT VARIABLES. Carl Kaplan. August 1954. 18p. (NACA TN 3229)

APPLICATION OF TWO-DIMENSIONAL VORTEX THEORY TO THE PREDICTION OF FLOW FIELDS BEHIND WINGS OF WING-BODY COMBINATIONS AT SUBSONIC AND SUPERSONIC SPEEDS. Arthur Wm. Rogers. September 1954. (ii), 91p. diagrs., photo., 3 tabs. (NACA TN 3227)

SUBSONIC EDGES IN THIN-WING AND SLENDER-BODY THEORY. Milton D. Van Dyke. November 1954. 26p. diagrs. (NACA TN 3343)

ON THE SMALL-DISTURBANCE ITERATION METHOD FOR THE FLOW OF A COMPRESSIBLE FLUID WITH APPLICATION TO A PARABOLIC CYLINDER. Carl Kaplan. January 1955. 36p. diagrs., tab. (NACA TN 3318)

SOME CONSIDERATIONS ON TWO-DIMENSIONAL THIN AIRFOILS DEFORMING IN SUPERSONIC FLOW. Eugene Migotsky. January 1955. 36p. diagrs. (NACA TN 3386)

SIMILAR SOLUTIONS FOR THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH HEAT TRANSFER AND PRESSURE GRADIENT. Clarence B. Cohen and Eli Reshotko. February 1955. 67p. diagrs., 2 tabs. (NACA TN 3325)

A RAPID APPROXIMATE METHOD FOR THE DESIGN OF HUB SHROUD PROFILES OF CENTRIFUGAL IMPELLERS OF GIVEN BLADE SHAPE. Kenneth J. Smith and Joseph T. Hamrick. March 1955. 26p. diagrs., 3 tabs. (NACA TN 3399)

THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH FLUID INJECTION. George M. Low. March 1955. 29p. diagrs., 3 tabs. (NACA TN 3404)

THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH HEAT TRANSFER AND ARBITRARY PRESSURE GRADIENT. Clarence B. Cohen and Eli Reshotko. April 1955. 43p. diagrs., 2 tabs. (NACA TN 3326)

A SELF-EXCITED, ALTERNATING-CURRENT, CONSTANT-TEMPERATURE HOT-WIRE ANEMOMETER. Charles E. Shepard. April 1955. 29p. diagrs., photos. (NACA TN 3406)

ANALYTIC DETERMINATION OF THE DISCHARGE COEFFICIENTS OF FLOW NOZZLES. Frederick S. Simmons. April 1955. 15p. diagrs. (NACA TN 3447)

SEPARATION, STABILITY, AND OTHER PROPERTIES OF COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH PRESSURE GRADIENT AND HEAT TRANSFER. Morris Morduchow and Richard G. Grape, Polytechnic Institute of Brooklyn. May 1955. 45p. diagrs., 6 tabs. (NACA TN 3296)



## SUBSONIC FLOW (1.1.2.1)

ERROR IN AIRSPEED MEASUREMENT DUE TO STATIC-PRESSURE FIELD AHEAD OF SHARP-NOSE BODIES OF REVOLUTION AT TRANSONIC SPEEDS. Edward C. B. Danforth and J. Ford Johnston. August 19, 1949. 31p. diagrs., photos. (NACA RM L9C25)

MEASUREMENTS OF THE DRAG AND PRESSURE DISTRIBUTION ON A BODY OF REVOLUTION THROUGHOUT TRANSITION FROM SUBSONIC TO SUPERSONIC SPEEDS. Jim Rogers Thompson. January 16, 1950. 36p. diagrs., photos., 2 tabs. (NACA RM L9J27)

PRELIMINARY INVESTIGATION OF THE EFFECTS OF RECTANGULAR VORTEX GENERATORS ON THE PERFORMANCE OF A SHORT 1.9:1 STRAIGHT-WALL ANNULAR DIFFUSER. Charles C. Wood. October 1951. 27p. diagrs., photo., tab. (NACA RM L51G09)

DIRECT MEASUREMENTS OF SKIN FRICTION. Satish Dhawan, California Institute of Technology. 1953. ii, 20p. diagrs., photos. (NACA Rept. 1121. Formerly TN 2567)

EQUATIONS, TABLES, AND CHARTS FOR COMPRESSIBLE FLOW. Ames Research Staff. 1953. iii, 69p. diagrs., 25 charts, 2 tabs. (NACA Rept. 1135. Formerly TN 1428)

ON TRANSONIC FLOW PAST A WAVE-SHAPED WALL. Carl Kaplan. 1953. ii, 12p. (NACA Rept. 1149. Formerly TN 2748)

A COMPARISON OF THE EXPERIMENTAL SUBSONIC PRESSURE DISTRIBUTIONS ABOUT SEVERAL BODIES OF REVOLUTION WITH PRESSURE DISTRIBUTIONS COMPUTED BY MEANS OF THE LINEARIZED THEORY. Clarence W. Mathews. 1953. ii, 29p. diagrs., tab. (NACA Rept. 1155. Formerly TN 2519; RM L9F28)

SECONDARY FLOWS AND BOUNDARY-LAYER ACCUMULATIONS IN TURBINE NOZZLES. Harold E. Rohlik, Milton G. Kofskey, Hubert W. Allen and Howard Z. Herzig. 1954. ii, 32p. diagrs., photos., 3 tabs. (NACA Rept. 1168. Formerly TN 2871; TN 2909; TN 2989)

METHOD FOR RAPID DETERMINATION OF PRESSURE CHANGE FOR ONE-DIMENSIONAL FLOW WITH HEAT TRANSFER, FRICTION, ROTATION, AND AREA CHANGE. James E. Hubbart, Henry O. Slone and Vernon L. Arne. June 1954. 22p. diagrs., 2 tabs. (NACA TN 3150)

SMOKE STUDY OF NOZZLE SECONDARY FLOWS IN A LOW-SPEED TURBINE. Milton G. Kofskey and Hubert W. Allen. November 1954. 24p. diagrs., photos. (NACA TN 3260)

APPROXIMATE EFFECT OF LEADING-EDGE THICKNESS, INCIDENCE ANGLE, AND INLET MACH NUMBER ON INLET LOSSES FOR HIGH-SOLIDITY CASCADES OF LOW CAMBERED BLADES. Linwood C. Wright. December 1954. 38p. diagrs. (NACA TN 3327)

PREDICTION OF LOSSES INDUCED BY ANGLES OF ATTACK IN CASCADES OF SHARP-NOSED BLADES FOR INCOMPRESSIBLE AND SUBSONIC COMPRESSIBLE FLOW. James J. Kramer and John D. Stanitz. January 1955. 45p. diagrs. (NACA TN 3149)

STUDY OF THE MOMENTUM DISTRIBUTION OF TURBULENT BOUNDARY LAYERS IN ADVERSE PRESSURE GRADIENTS. Virgil A. Sandborn and Raymond J. Slogar. January 1955. 79p. diagrs., photos. (NACA TN 3264)

SECOND-ORDER SUBSONIC AIRFOIL-SECTION THEORY AND ITS PRACTICAL APPLICATION. Milton D. Van Dyke. March 1955. 50p. diagrs., 5 tabs. (NACA TN 3390)

AERODYNAMIC CHARACTERISTICS OF SEVERAL 6-PERCENT-THICK AIRFOILS AT ANGLES OF ATTACK FROM  $0^\circ$  TO  $20^\circ$  AT HIGH SUBSONIC SPEEDS. Bernard N. Daley and Douglas R. Lord. May 1955. 57p. diagrs., photos. (NACA TN 3424. Formerly RM L9E19)

## MIXED FLOW (1.1.2.2)

DRAG OF A WING-BODY CONFIGURATION CONSISTING OF A SWEEP-FORWARD TAPERED WING MOUNTED ON A BODY OF FINENESS RATIO 12 MEASURED DURING FREE FALL AT TRANSONIC SPEEDS. Jim Rogers Thompson and Charles W. Mathews. March 13, 1947. 15p. diagrs., photos. (NACA RM L6L24)

FLIGHT TESTS TO DETERMINE THE DRAG OF FIN-STABILIZED PARABOLIC BODIES AT TRANSONIC AND SUPERSONIC SPEEDS. Sidney R. Alexander, Leo T. Chauvin and Charles B. Rumsey. April 21, 1948. 24p. diagrs., photos. (NACA RM L8A05)

APPLICATION OF ONE PART OF VON KARMAN'S TWO-DIMENSIONAL TRANSONIC SIMILARITY LAW TO DRAG DATA OF NACA 65-SERIES WINGS. Kenneth B. Amer. August 24, 1948. 9p. diagrs. (NACA RM L8F24)

EFFECT OF WING SWEEP, TAPER, AND THICKNESS RATIO ON THE TRANSONIC DRAG CHARACTERISTICS OF WING-BODY COMBINATIONS. Jim Rogers Thompson and Charles W. Mathews. December 31, 1948. 29p. diagrs., photos., 2 tabs. (NACA RM L8K01)

ESTIMATION OF LIFT AND DRAG OF AIRFOILS AT NEAR SONIC SPEEDS AND IN THE PRESENCE OF DETACHED SHOCK WAVES. John P. Mayer. February 23, 1949. 23p. diagrs. (NACA RM L8L07)

STUDY BY NACA WING-FLOW METHOD OF TRANSONIC DRAG CHARACTERISTICS OF A BLUNT-NOSE BODY OF REVOLUTION AND COMPARISON WITH RESULTS FOR A SHARP-NOSE BODY. J. Ford Johnston and Mitchell Lopatoff. April 26, 1949. 26p. diagrs., photos. (NACA RM L9C11)

ERROR IN AIRSPEED MEASUREMENT DUE TO STATIC-PRESSURE FIELD AHEAD OF SHARP-NOSE BODIES OF REVOLUTION AT TRANSONIC SPEEDS. Edward C. B. Danforth and J. Ford Johnston. August 19, 1949. 31p. diagrs., photos. (NACA RM L9C25)

MEASUREMENTS OF THE DRAG AND PRESSURE DISTRIBUTION ON A BODY OF REVOLUTION THROUGHOUT TRANSITION FROM SUBSONIC TO SUPERSONIC SPEEDS. Jim Rogers Thompson. January 16, 1950. 36p. diagrs., photos., 2 tabs. (NACA RM L9J27)



## AERODYNAMICS

### 4 FUNDAMENTAL (1.1)

#### Mixed Flow - Compressible (Cont.)

AN 8-FOOT AXISYMMETRICAL FIXED NOZZLE FOR SUBSONIC MACH NUMBERS UP TO 0.99 AND FOR A SUPERSONIC MACH NUMBER OF 1.2. Virgil S. Ritchie, Ray H. Wright and Marshall P. Tulin. February 23, 1950. 52p. diags., photos., 2 tabs. (NACA RM L50A03a)

PRESSURE MEASUREMENTS AT SUPERSONIC SPEEDS ON A SECTION OF A RECTANGULAR WING HAVING AN NACA 65-009 PROFILE. Robert W. Rainey. March 10, 1950. 31p. diags., photos., tab. (NACA RM L9L16)

PRELIMINARY INVESTIGATION OF THE TRANSONIC CHARACTERISTICS OF AN NACA SUBMERGED INLET. John A. Axelson and Robert A. Taylor. June 5, 1950. 44p. diags., photos. (NACA RM A50C13)

EXPERIMENTAL INVESTIGATION OF SUPERSONIC FLOW WITH DETACHED SHOCK WAVES FOR MACH NUMBERS BETWEEN 1.8 AND 2.9. W. E. Moeckel. July 5, 1950. 56p. diags., photos., 4 tabs. (NACA RM E50D05)

A PRELIMINARY FLIGHT INVESTIGATION OF THE EFFECTS OF VORTEX GENERATORS ON SEPARATION DUE TO SHOCK. Lindsay J. Lina and Wilmer H. Reed, III. November 30, 1950. 30p. diags., photos., tab. (NACA RM L50J02)

THE USE OF SUCTION TO PREVENT SHOCK-INDUCED SEPARATION IN A NOZZLE. James R. Sterrett, Robert W. Dunning and Maurice J. Brevoort. January 30, 1951. 64p. diags., photos., 2 tabs. (NACA RM L50K20)

PRESSURE-DISTRIBUTION MEASUREMENTS OVER A 45° SWEEPBACK WING AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. Edward C. B. Danforth and Thomas C. O'Bryan. June 1951. 42p. diags., photos. (NACA RM L51D24)

WING-FLOW STUDY OF PRESSURE-DRAG REDUCTION AT TRANSONIC SPEED BY PROJECTING A JET OF AIR FROM THE NOSE OF A PROLATE SPHEROID OF FINENESS RATIO 6. Mitchell Lopatoff. October 1951. 20p. photos., diags., tab. (NACA RM L51E09)

PRESSURE PULSATIONS ON RIGID AIRFOILS AT TRANSONIC SPEEDS. Milton D. Humphreys. December 1951. 21p. diags., photos., tab. (NACA RM L51I12)

A CORRELATION BY MEANS OF THE TRANSONIC SIMILARITY RULES OF THE EXPERIMENTALLY DETERMINED CHARACTERISTICS OF 22 RECTANGULAR WINGS OF SYMMETRICAL PROFILE. John B. McDevitt. February 1952. 60p. diags., 3 tabs. (NACA RM A51L17b)

THE EFFECTS OF CAMBER AND LEADING-EDGE-FLAP DEFLECTION ON THE PRESSURE PULSATIONS ON THIN RIGID AIRFOILS AT TRANSONIC SPEEDS. Milton D. Humphreys and John D. Kent. October 1952. 26p. diags., photos., tab. (NACA RM L52G22)

EFFECT OF THICKNESS, CAMBER, AND THICKNESS DISTRIBUTION ON AIRFOIL CHARACTERISTICS AT MACH NUMBERS UP TO 1.0. Bernard N. Daley and Richard S. Dick. October 1952. 76p. photos., diags., tab. (NACA RM L52G31a)

THE EFFECTS OF A SMALL JET OF AIR EXHAUSTING FROM THE NOSE OF A BODY OF REVOLUTION IN SUPERSONIC FLOW. Eugene S. Love. November 1952. 45p. diags., photos. (NACA RM L52I19a)

ON TRANSONIC FLOW PAST A WAVE-SHAPED WALL. Carl Kaplan. 1953. ii, 12p. (NACA Rept. 1149. Formerly TN 2748)

A COMPARISON OF THE EXPERIMENTAL SUBSONIC PRESSURE DISTRIBUTIONS ABOUT SEVERAL BODIES OF REVOLUTION WITH PRESSURE DISTRIBUTIONS COMPUTED BY MEANS OF THE LINEARIZED THEORY. Clarence W. Matthews. 1953. ii, 29p. diags., tab. (NACA Rept. 1155. Formerly TN 2519; RM L9F28)

A CORRELATION BY MEANS OF TRANSONIC SIMILARITY RULES OF THE EXPERIMENTALLY DETERMINED CHARACTERISTICS OF 18 CAMBERED WINGS OF RECTANGULAR PLAN FORM. John B. McDevitt. September 1953. 57p. diags. (NACA RM A53G31)

TRANSONIC AERODYNAMIC CHARACTERISTICS OF AN NACA 64A006 AIRFOIL SECTION WITH A 15-PERCENT-CHORD LEADING-EDGE FLAP. Milton D. Humphreys. September 1953. 44p. diags., photos. (NACA RM L53G23)

THEORETICAL STUDY OF THE TRANSONIC LIFT OF A DOUBLE-WEDGE PROFILE WITH DETACHED BOW WAVE. Walter G. Vincenti and Cleo B. Wagoner. (Portions of this work were reported at the eighth International Congress on Theoretical and Applied Mechanics, Istanbul, Turkey, August 20-28, 1952). 1954. ii, 24p. diags., 2 tabs. (NACA Rept. 1180. Formerly TN 2832)

AN EXPERIMENTAL STUDY OF THE LIFT AND PRESSURE DISTRIBUTION ON A DOUBLE-WEDGE PROFILE AT MACH NUMBERS NEAR SHOCK ATTACHMENT. Walter G. Vincenti, Duane W. Dugan and E. Ray Phelps. July 1954. 43p. diags. (NACA TN 3225)

TRANSONIC FLOW PAST CONE CYLINDERS. George E. Solomon, California Institute of Technology. September 1954. 56p. diags., photos. (NACA TN 3213)

AN INVESTIGATION OF A LIFTING 10-PERCENT-THICK SYMMETRICAL DOUBLE-WEDGE AIRFOIL AT MACH NUMBERS UP TO 1. Milton D. Humphreys. November 1954. 35p. diags., photos., tab. (NACA TN 3306)

AERODYNAMIC CHARACTERISTICS OF SEVERAL 6-PERCENT-THICK AIRFOILS AT ANGLES OF ATTACK FROM 0° TO 20° AT HIGH SUBSONIC SPEEDS. Bernard N. Daley and Douglas R. Lord. May 1955. 57p. diags., photos. (NACA TN 3424. Formerly RM L9E19)

#### SUPERSONIC FLOW

##### (1.1.2.3)

FLIGHT TESTS TO DETERMINE THE DRAG OF FIN-STABILIZED PARABOLIC BODIES AT TRANSONIC AND SUPERSONIC SPEEDS. Sidney R. Alexander, Leo T. Chauvin and Charles B. Rumsey. April 21, 1948. 24p. diags., photos. (NACA RM L8A05)



## Supersonic Flow - Compressible (Cont.)

EFFECT OF WING SWEEP, TAPER, AND THICKNESS RATIO ON THE TRANSONIC DRAG CHARACTERISTICS OF WING-BODY COMBINATIONS. Jim Rogers Thompson and Charles W. Mathews. December 31, 1948. 29p. diagrs., photos., 2 tabs. (NACA RM L8K01)

EXPERIMENTAL PRESSURE DISTRIBUTIONS OVER WING TIPS AT MACH NUMBER 1.9. I - WING TIP WITH SUBSONIC LEADING EDGE. James M. Jagger and Harold Mirels. January 27, 1949. 28p. diagrs. photo. (NACA RM E8K26)

ESTIMATION OF LIFT AND DRAG OF AIRFOILS AT NEAR SONIC SPEEDS AND IN THE PRESENCE OF DETACHED SHOCK WAVES. John P. Mayer. February 23, 1949. 23p. diagrs. (NACA RM L8L07)

STUDY BY NACA WING-FLOW METHOD OF TRANSONIC DRAG CHARACTERISTICS OF A BLUNT-NOSE BODY OF REVOLUTION AND COMPARISON WITH RESULTS FOR A SHARP-NOSE BODY. J. Ford Johnston and Mitchell Lopatoff. April 26, 1949. 26p. diagrs., photos. (NACA RM L9C11)

TESTS OF LIFTING SURFACES ON CONICAL AND CYLINDRICAL PORTIONS OF A BODY AT SUBSONIC MACH NUMBERS AND AT A MACH NUMBER OF 1.2. Robert S. Osborne and John B. Wright. September 2, 1949. 22p. diagrs. (NACA RM L9F29)

EXPERIMENTAL PRESSURE DISTRIBUTIONS OVER WING TIPS AT MACH NUMBER 1.9. II - WING TIP WITH SUBSONIC TRAILING EDGE. Harold Mirels and James M. Jagger. December 21, 1949. 23p. diagrs., photo. (NACA RM E9I22a)

MEASUREMENTS OF THE DRAG AND PRESSURE DISTRIBUTION ON A BODY OF REVOLUTION THROUGHOUT TRANSITION FROM SUBSONIC TO SUPERSONIC SPEEDS. Jim Rogers Thompson. January 16, 1950. 36p. diagrs., photos., 2 tabs. (NACA RM L9J27)

INVESTIGATION AT MACH NUMBER 1.62 OF THE PRESSURE DISTRIBUTION OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 25, 1950. 81p. diagrs., photos. (NACA RM L9J05)

THE TIME LAG BETWEEN FLAP DEFLECTION AND FORCE DEVELOPMENT AT A MACH NUMBER OF 4. Walter F. Lindsey and Edward F. Ulmann. February 13, 1950. 11p. diagrs., photos. (NACA RM L9L15)

AN 8-FOOT AXISYMMETRICAL FIXED NOZZLE FOR SUBSONIC MACH NUMBERS UP TO 0.99 AND FOR A SUPERSONIC MACH NUMBER OF 1.2. Virgil S. Ritchie, Ray H. Wright and Marshall P. Tulin. February 23, 1950. 52p. diagrs., photos., 2 tabs. (NACA RM L50A03a)

AERODYNAMIC INVESTIGATION AT MACH NUMBER 1.92 OF A RECTANGULAR WING AND TAIL AND BODY CONFIGURATION AND ITS COMPONENTS. Macon C. Ellis, Jr. and Carl E. Grigsby. March 1, 1950. 96p. diagrs., photos., 4 tabs. (NACA RM L9L28a)

PRESSURE MEASUREMENTS AT SUPERSONIC SPEEDS ON A SECTION OF A RECTANGULAR WING HAVING AN NACA 65-009 PROFILE. Robert W. Rainey. March 10, 1950. 31p. diagrs., photos., tab. (NACA RM L9L16)

EXPERIMENTAL INVESTIGATION OF SUPERSONIC FLOW WITH DETACHED SHOCK WAVES FOR MACH NUMBERS BETWEEN 1.8 AND 2.9. W. E. Moeckel. July 5, 1950. 56p. diagrs., photos., 4 tabs. (NACA RM E50D05)

DOWNWASH IN VORTEX REGION BEHIND RECTANGULAR HALF-WING AT MACH NUMBER 1.91. John L. Cummings and Rudolph C. Haefeli. October 26, 1950. 43p. diagrs., photos., tab. (NACA RM E50H10)

THE EXTERNAL-SHOCK DRAG OF SUPERSONIC INLETS HAVING SUBSONIC ENTRANCE FLOW. Louis M. Nucci. December 20, 1950. 28p. diagrs., photos. (NACA RM L50G14a)

INVESTIGATION AT SUPERSONIC SPEEDS OF SOME OF THE FACTORS AFFECTING THE FLOW OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 2, 1951. 111p. diagrs., photos. (NACA RM L50J18)

SUPERSONIC TUNNEL INVESTIGATION BY MEANS OF INCLINED-PLATE TECHNIQUE TO DETERMINE PERFORMANCE OF SEVERAL NOSE INLETS OVER MACH NUMBER RANGE OF 1.72 TO 2.18. Jerome L. Fox. February 14, 1951. 27p. diagrs., photos. (NACA RM E50K14)

VELOCITY AND TEMPERATURE FIELDS IN CIRCULAR JET EXPANDING FROM CHOKED NOZZLE INTO QUIESCENT AIR. Morris D. Rousoo and Fred D. Kochendorfer. July 1951. 34p. diagrs., photos. (NACA RM E51F18. Formerly RM E50E03a)

APPARATUS FOR OBTAINING A SUPERSONIC FLOW OF VERY SHORT DURATION AND SOME DRAG MEASUREMENTS OBTAINED WITH ITS USE. John E. Yeates, Jr., F. J. Bailey, Jr. and T. J. Voglewede. July 23, 1951. 23p. diagrs., photos. (NACA RM L9C01)

WING-FLOW STUDY OF PRESSURE-DRAG REDUCTION AT TRANSONIC SPEED BY PROJECTING A JET OF AIR FROM THE NOSE OF A PROLATE SPHEROID OF FINENESS RATIO 6. Mitchell Lopatoff. October 1951. 20p. photos., diagrs., tab. (NACA RM L51E09)

BODIES OF REVOLUTION FOR MINIMUM DRAG AT HIGH SUPERSONIC AIRSPEEDS. A. J. Eggers, Jr., David H. Dennis and Meyer M. Resnikoff. February 1952. 44p. diagrs., photos. (NACA RM A51K27)

PRESSURE DISTRIBUTION AND AERODYNAMIC COEFFICIENTS ASSOCIATED WITH HEAT ADDITION TO SUPERSONIC AIR STREAM ADJACENT TO TWO-DIMENSIONAL SUPERSONIC WING. I. Irving Pinkel, John S. Serafini and John L. Gregg. February 1952. 33p. diagrs., tab. (NACA RM E51K26)

THE EFFECT OF BLUNTNESS ON THE DRAG OF SPHERICAL-TIPPED TRUNCATED CONES OF FINENESS RATIO 3 AT MACH NUMBERS 1.2 TO 7.4. Simon C. Sommer and James A. Stark. April 1952. 18p. photos., diagrs. (NACA RM A52B13)



AERODYNAMICS  
6 FUNDAMENTAL (1. 1)

Supersonic Flow - Compressible  
(Cont.)

PRELIMINARY INVESTIGATION OF THE DRAG CHARACTERISTICS OF THE NACA RM-10 MISSILE AT MACH NUMBERS OF 1.40 AND 1.59 IN THE LANGLEY 4- BY 4-FOOT SUPERSONIC TUNNEL. Lowell E. Hasel, Archibald R. Sinclair and Clyde V. Hamilton, April 1952. 49p. diagrs., photos, 3 tabs. (NACA RM L52A14)

FLIGHT MEASUREMENTS OF THE EFFECTS OF SURFACE CONDITION ON THE SUPERSONIC DRAG OF FIN-STABILIZED PARABOLIC BODIES OF REVOLUTION. H. Herbert Jackson. May 1952. 17p. diagrs., photos. (NACA RM L52B26)

SUPPLEMENTARY NOTE ON MODIFIED-IMPACT-THEORY CALCULATIONS FOR BODIES OF REVOLUTION HAVING MINIMUM DRAG AT HYPERSONIC SPEEDS. Meyer M. Resnikoff. July 1952. 13p. diagr. (NACA RM A52D24)

EFFECTS OF PLAN FORM, AIRFOIL SECTION, AND ANGLE OF ATTACK ON THE PRESSURES ALONG THE BASE OF BLUNT-TRAILING-EDGE WINGS AT MACH NUMBERS OF 1.41, 1.62, AND 1.96. Kenneth L. Goin. September 1952. 52p. photos., diagrs. (NACA RM L52D21)

INVESTIGATION OF THE VARIATION WITH REYNOLDS NUMBER OF THE BASE, WAVE, AND SKIN-FRICTION DRAG OF A PARABOLIC BODY OF REVOLUTION (NACA RM-10) AT MACH NUMBERS OF 1.62, 1.93, AND 2.41 IN THE LANGLEY 9-INCH SUPERSONIC TUNNEL. Eugene S. Love, Donald E. Coletti and August F. Bromm, Jr. October 1952. 62p. diagrs., photos., (NACA RM L52H21)

THE EFFECTS OF A SMALL JET OF AIR EXHAUSTING FROM THE NOSE OF A BODY OF REVOLUTION IN SUPERSONIC FLOW. Eugene S. Love. November 1952. 45p. diagrs., photos. (NACA RM L52I19a)

EQUATIONS, TABLES, AND CHARTS FOR COMPRESSIBLE FLOW. Ames Research Staff. 1953. iii, 69p. diagrs., 25 charts, 2 tabs. (NACA Rept. 1135. Formerly TN 1428)

A VECTOR STUDY OF LINEARIZED SUPERSONIC FLOW APPLICATIONS TO NONPLANAR PROBLEMS. John C. Martin. 1953. ii, 34p. diagrs., tab. (NACA Rept. 1143. Formerly TN 2641)

THE ZERO-LIFT DRAG OF A SLENDER BODY OF REVOLUTION (NACA RM-10 RESEARCH MODEL) AS DETERMINED FROM TESTS IN SEVERAL WIND TUNNELS AND IN FLIGHT AT SUPERSONIC SPEEDS. Albert J. Evans. 1954. ii, 13p. diagrs., tab. (NACA Rept. 1160. Formerly TN 2944)

CONVECTION OF A PATTERN OF VORTICITY THROUGH A SHOCK WAVE. H. S. Ribner. 1954. ii, 17p. diagrs. (NACA Rept. 1164. Formerly TN 2864)

SECONDARY FLOWS AND BOUNDARY-LAYER ACCUMULATIONS IN TURBINE NOZZLES. Harold E. Rohlik, Milton G. Kofskey, Hubert W. Allen and Howard Z. Herzig. 1954. ii, 32p. diagrs., photos., 3 tabs. (NACA Rept. 1168. Formerly TN 2871; TN 2909; TN 2989)

SOME NEW DRAG DATA ON THE NACA RM-10 MISSILE AND A CORRELATION OF THE EXISTING DRAG MEASUREMENTS AT  $M = 1.6$  AND  $3.0$ . Robert J. Carros and Carlton S. James. June 1954. 24p. diagrs., photos., tab. (NACA TN 3171)

TABLES FOR THE COMPUTATION OF WAVE DRAG OF ARROW WINGS OF ARBITRARY AIRFOIL SECTION. Frederick C. Grant and Morton Cooper. June 1954. 9p. diagr., 28p. tabs. (in pocket) (NACA TN 3185)

AN EXPLORATORY INVESTIGATION OF SKIN FRICTION AND TRANSITION ON THREE BODIES OF REVOLUTION AT A MACH NUMBER OF 1.61. John H. Hilton, Jr. and K. R. Czarnecki. June 1954. 15p. diagrs. (NACA TN 3193)

MEASUREMENT OF HEAT TRANSFER IN THE TURBULENT BOUNDARY LAYER ON A FLAT PLATE IN SUPERSONIC FLOW AND COMPARISON WITH SKIN-FRICTION RESULTS. C. C. Pappas. June 1954. 32p. diagrs., tab. (NACA TN 3222)

LIFT AND PITCHING MOMENT AT SUPERSONIC SPEEDS DUE TO CONSTANT VERTICAL ACCELERATION FOR THIN SWEEPBACK TAPERED WINGS WITH STREAMWISE TIPS. SUPERSONIC LEADING AND TRAILING EDGES. Isabella J. Cole and Kenneth Margolis. July 1954. 67p. diagrs., 4 tabs. (NACA TN 3196)

SHOCK-TURBULENCE INTERACTION AND THE GENERATION OF NOISE. H. S. Ribner. July 1954. 60p. diagrs., tab. (NACA TN 3255)

AN ANALYSIS OF SHOCK-WAVE CANCELLATION AND REFLECTION FOR POROUS WALLS WHICH OBEY AN EXPONENTIAL MASS-FLOW PRESSURE-DIFFERENCE RELATION. Joseph M. Spiegel and Phillips J. Tunnell. August 1954. 23p. diagrs. (NACA TN 3223)

INVESTIGATION OF MACH NUMBER CHANGES OBTAINED BY DISCHARGING HIGH-PRESSURE PULSE THROUGH WIND TUNNEL OPERATING SUPERSONICALLY. Rudolph C. Haefeli and Harry Bernstein. August 1954. 14p. diagrs., photos., tab. (NACA TN 3258)

EXAMINATION OF THE EXISTING DATA ON THE HEAT TRANSFER OF TURBULENT BOUNDARY LAYERS AT SUPERSONIC SPEEDS FROM THE POINT OF VIEW OF REYNOLDS ANALOGY. Alvin Seiff. August 1954. 38p. diagrs., tab. (NACA TN 3284)

HEAT TRANSFER FROM A HEMISPHERE-CYLINDER EQUIPPED WITH FLOW-SEPARATION SPIKES. Jackson R. Stalder and Helmer V. Nielsen. September 1954. 29p. diagrs., photos. (NACA TN 3287)

INVESTIGATION OF LIFT, DRAG, AND PITCHING MOMENT OF A  $60^\circ$  DELTA-WING—BODY COMBINATION (AGARD CALIBRATION MODEL B) IN THE LANGLEY 9-INCH SUPERSONIC TUNNEL. August F. Bromm, Jr. September 1954. 18p. diagrs., photos. (NACA TN 3300)

TURBULENT-HEAT-TRANSFER MEASUREMENTS AT A MACH NUMBER OF 3.03. Maurice J. Brevoort and Bernard Rashis. September 1954. 21p. diagrs., tab. (NACA TN 3303)

LIQUEFACTION OF AIR IN THE LANGLEY 11-INCH HYPERSONIC TUNNEL. Charles H. McLellan and Thomas W. Williams. October 1954. 36p. diagrs., 4 tabs. (NACA TN 3302)

EXPERIMENTAL DETERMINATION OF BOUNDARY-LAYER TRANSITION ON A BODY OF REVOLUTION AT  $M = 3.5$ . James R. Jedicke, Max E. Wilkins and Alvin Seiff. October 1954. 56p. diagrs., photos. (NACA TN 3342. Formerly RM A53L18)



## Supersonic Flow - Compressible (Cont.)

ON THE DETERMINATION OF CERTAIN BASIC TYPES OF SUPERSONIC FLOW FIELDS. (Sulla determinazione di alcuni tipi di campi di corrente ipersonora). Carlo Ferrari. November 1954. 17p. diags. (NACA TM 1381. Trans. from Rendiconti della R. Accademie Nazionale dei Lincei, Series 8, v. 7, no. 6, Dec. 1949)

VISCOSITY CORRECTIONS TO CONE PROBES IN RAREFIED SUPERSONIC FLOW AT A NOMINAL MACH NUMBER OF 4. L. Talbot, University of California. November 1954. 39p. diags., photo., 4 tabs. (NACA TN 3219)

INITIAL EXPERIMENTS ON FLUTTER OF UNSWEPT CANTILEVER WINGS AT MACH NUMBER 1.3. W. J. Tuovila, John E. Baker and Arthur A. Regier. November 1954. 19p. diags., photos., 2 tabs. (NACA TN 3312. Formerly RM L8J11)

ARRANGEMENT OF FUSIFORM BODIES TO REDUCE THE WAVE DRAG AT SUPERSONIC SPEEDS. Morris D. Friedman and Doris Cohen. November 1954. 23p. diags. (NACA TN 3345. Formerly RM A51I20)

THEORETICAL CALCULATIONS OF THE LATERAL STABILITY DERIVATIVES FOR TRIANGULAR VERTICAL TAILS WITH SUBSONIC LEADING EDGES TRAVELING AT SUPERSONIC SPEEDS. Percy J. Bobbitt. December 1954. 68p. diags., photos., 5 tabs. (NACA TN 3240)

BOUNDARY-LAYER TRANSITION AT MACH 3.12 WITH AND WITHOUT SINGLE ROUGHNESS ELEMENTS. Paul F. Brinich. December 1954. 41p. diags. (NACA TN 3267)

SHOCKS IN HELICAL FLOWS THROUGH ANNULAR CASCADES OF STATOR BLADES. Robert Wasserman and Arthur W. Goldstein. December 1954. 27p. diags. (NACA TN 3329)

GENERAL THEORY OF CONICAL FLOWS AND ITS APPLICATION TO SUPERSONIC AERODYNAMICS. (La théorie générale des mouvements coniques et ses applications a l'aérodynamique supersonique). Paul Germain. PREFACE. M. J. Peres. January 1955. vii, 333p. diags. (NACA TM 1354. Trans. from Office National d'Études et de Recherches Aéronautiques, Pub. 34, 1949)

AN ACCURATE AND RAPID METHOD FOR THE DESIGN OF SUPERSONIC NOZZLES. Ivan E. Beckwith and John A. Moore. February 1955. 57p. diags., 3 tabs. (NACA TN 3322)

MINIMUM-DRAG BODIES OF REVOLUTION IN A NONUNIFORM SUPERSONIC FLOW FIELD. Conrad Rennemann, Jr. February 1955. 25p. diags. (NACA TN 3369)

National Advisory Committee for Aeronautics. AXIALLY SYMMETRIC SHAPES WITH MINIMUM WAVE DRAG. Max. A. Heaslet and Franklyn B. Fuller. February 1955. 46p. diags. (NACA TN 3389)

THEORETICAL CALCULATIONS OF THE PRESSURES, FORCES, AND MOMENTS DUE TO VARIOUS LATERAL MOTIONS ACTING ON THIN ISOLATED VERTICAL TAILS WITH SUPERSONIC LEADING AND TRAILING EDGES. Kenneth Margolis. March 1955. 43p. diags., 10 tabs. (NACA TN 3373)

TURBULENT-HEAT-TRANSFER MEASUREMENTS AT A MACH NUMBER OF 2.06. Maurice J. Brevoort and Bernard Rashis. March 1955. 20p. diags., tab. (NACA TN 3374)

FREE-FLIGHT MEASUREMENTS OF TURBULENT-BOUNDARY-LAYER SKIN FRICTION IN THE PRESENCE OF SEVERE AERODYNAMIC HEATING AT MACH NUMBERS FROM 2.8 TO 7.0. Simon C. Sommer and Barbara J. Short. March 1955. 47p. diags., photos., 2 tabs. (NACA TN 3391)

AN EXPERIMENTAL INVESTIGATION OF THE BASE PRESSURE CHARACTERISTICS OF NON-LIFTING BODIES OF REVOLUTION AT MACH NUMBERS FROM 2.73 TO 4.98. John O. Reller, Jr. and Frank M. Hamaker. March 1955. 45p. diags., photos. (NACA TN 3393. Formerly RM A52E20)

APPLICATION OF THE GENERALIZED SHOCK-EXPANSION METHOD TO INCLINED BODIES OF REVOLUTION TRAVELING AT HIGH SUPERSONIC AIRSPEEDS. Raymond C. Savin. April 1955. 71p. diags., photos., tab. (NACA TN 3349)

THE ZERO-LIFT WAVE DRAG OF A PARTICULAR FAMILY OF UNSWEPT, TAPERED WINGS WITH LINEARLY VARYING THICKNESS RATIO. Arthur Henderson, Jr. and Julia M. Goodwin. May 1955. 28p. diags. (NACA TN 3418)

EFFECT OF A DISCONTINUITY ON TURBULENT BOUNDARY-LAYER-THICKNESS PARAMETERS WITH APPLICATION TO SHOCK-INDUCED SEPARATION. Eli Reshotko and Maurice Tucker. May 1955. 21p. diags. (NACA TN 3454)

## VISCOUS FLOW (1.1.3)

INVESTIGATION OF SOME TURBULENT-BOUNDARY-LAYER VELOCITY PROFILES AT A TUNNEL WALL WITH MACH NUMBERS UP TO 1.2. Marshall P. Tulin and Ray H. Wright. November 9, 1949. 22p. diags. (NACA RM L9H29a)

INVESTIGATION AT MACH NUMBER 1.62 OF THE PRESSURE DISTRIBUTION OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 25, 1950. 81p. diags., photos. (NACA RM L9J05)

PRELIMINARY INVESTIGATION OF THE DELAY OF TURBULENT FLOW SEPARATION BY MEANS OF WEDGE-SHAPED BODIES. George B. McCullough, Gerald E. Nitzberg and John A. Kelly. March 1, 1951. 28p. diags., photos. (NACA RM A50L12)

A SEMIEMPIRICAL METHOD FOR CALCULATING THE PITCHING MOMENT OF BODIES OF REVOLUTION AT LOW MACH NUMBERS. Edward J. Hopkins. May 17, 1951. 27p. diags., tab. (NACA RM A51C14)

A SUMMARY OF AVAILABLE KNOWLEDGE CONCERNING SKIN FRICTION AND HEAT TRANSFER AND ITS APPLICATION TO THE DESIGN OF HIGH-SPEED MISSILES. Morris W. Rubesin, Charles B. Rumsey and Steven A. Varga. November 1951. 17p. diags. (NACA RM A51J25a)



### Viscous Flow (Cont.)

EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF VORTEX GENERATORS ON THE MAXIMUM LIFT OF A 6-PERCENT-THICK SYMMETRICAL CIRCULAR-ARC AIRFOIL SECTION. William J. Bursnall. October 1952. 16p. diags., 2 tabs. (NACA RM L52G24)

DIRECT MEASUREMENTS OF SKIN FRICTION. Satish Dhawan, California Institute of Technology. 1953. ii, 20p. diags., photos. (NACA Rept. 1121. Formerly TN 2567)

A VISUALIZATION STUDY OF SECONDARY FLOWS IN CASCADES. Howard Z. Herzog, Arthur G. Hansen and George R. Costello. 1954. ii, 51p. diags., photos. (NACA Rept. 1163. Formerly TN 2947; RM E52F19)

EXPERIMENTAL INVESTIGATION OF TEMPERATURE RECOVERY FACTORS ON A  $10^\circ$  CONE AT ANGLE OF ATTACK AT A MACH NUMBER OF 3.12. John R. Jack and Barry Moskowitz. July 1954. 15p. diags. (NACA TN 3256)

VISCOSITY CORRECTIONS TO CONE PROBES IN RAREFIED SUPERSONIC FLOW AT A NOMINAL MACH NUMBER OF 4. L. Talbot, University of California. November 1954. 39p. diags., photo., 4 tabs. (NACA TN 3219)

SMOKE STUDY OF NOZZLE SECONDARY FLOWS IN A LOW-SPEED TURBINE. Milton G. Kofskey and Hubert W. Allen. November 1954. 24p. diags., photos. (NACA TN 3260)

SHEARING-STRESS MEASUREMENTS BY USE OF A HEATED ELEMENT. H. W. Liepmann and G. T. Skinner, California Institute of Technology. November 1954. 27p. diags. (NACA TN 3268)

THEORETICAL AND EXPERIMENTAL INVESTIGATION OF AERODYNAMIC-HEATING AND ISOTHERMAL HEAT-TRANSFER PARAMETERS ON A HEMISPHERICAL NOSE WITH LAMINAR BOUNDARY LAYER AT SUPERSONIC MACH NUMBERS. Howard A. Stine and Kent Wanlass. December 1954. 48p. diags., photo., tab. (NACA TN 3344)

A FIBROUS-GLASS COMPACT AS A PERMEABLE MATERIAL FOR BOUNDARY-LAYER-CONTROL APPLICATIONS USING AREA SUCTION. Robert E. Dannenberg, James A. Weiberg and Bruno J. Gambucci. January 1955. 20p. diags., photos., 2 tabs. (NACA TN 3388)

A THEORY FOR PREDICTING THE FLOW OF REAL GASES IN SHOCK TUBES WITH EXPERIMENTAL VERIFICATION. Robert L. Trimpi and Nathaniel B. Cohen. March 1955. 69p. diags., photo. (NACA TN 3375)

AN EXPERIMENTAL INVESTIGATION OF THE BASE PRESSURE CHARACTERISTICS OF NON-LIFTING BODIES OF REVOLUTION AT MACH NUMBERS FROM 2.73 TO 4.98. John O. Reller, Jr. and Frank M. Hamaker. March 1955. 45p. diags., photos. (NACA TN 3393. Formerly RM A52E20)

### LAMINAR FLOW (1.1.3.1)

PRESSURE MEASUREMENTS AT SUPERSONIC SPEEDS ON A SECTION OF A RECTANGULAR WING HAVING AN NACA 65-009 PROFILE. Robert W. Rainey. March 10, 1950. 31p. diags., photos., tab. (NACA RM L9L16)

INVESTIGATION AT SUPERSONIC SPEEDS OF SOME OF THE FACTORS AFFECTING THE FLOW OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 2, 1951. 111p. diags., photos. (NACA RM L50J18)

PRELIMINARY INVESTIGATION OF THE DRAG CHARACTERISTICS OF THE NACA RM-10 MISSILE AT MACH NUMBERS OF 1.40 AND 1.59 IN THE LANGLEY 4- BY 4-FOOT SUPERSONIC TUNNEL. Lowell E. Hasel, Archibald R. Sinclair and Clyde V. Hamilton, April 1952. 49p. diags., photos, 3 tabs. (NACA RM L52A14)

SKIN-FRICTION DRAG AND BOUNDARY-LAYER TRANSITION ON A PARABOLIC BODY OF REVOLUTION (NACA RM-10) AT A MACH NUMBER OF 1.6 IN THE LANGLEY 4- BY 4-FOOT SUPERSONIC PRESSURE TUNNEL. K. R. Czarnecki and Jack E. Marte. May 1952. 24p. diags., photos. (NACA RM L52C24)

INVESTIGATION OF THE VARIATION WITH REYNOLDS NUMBER OF THE BASE, WAVE, AND SKIN-FRICTION DRAG OF A PARABOLIC BODY OF REVOLUTION (NACA RM-10) AT MACH NUMBERS OF 1.62, 1.93, AND 2.41 IN THE LANGLEY 9-INCH SUPERSONIC TUNNEL. Eugene S. Love, Donald E. Coletti and August F. Bromm, Jr. October 1952. 62p. diags., photos., (NACA RM L52H21)

THE EFFECTS OF A SMALL JET OF AIR EXHAUSTING FROM THE NOSE OF A BODY OF REVOLUTION IN SUPERSONIC FLOW. Eugene S. Love. November 1952. 45p. diags., photos. (NACA RM L52I19a)

THE ZERO-LIFT DRAG OF A SLENDER BODY OF REVOLUTION (NACA RM-10 RESEARCH MODEL) AS DETERMINED FROM TESTS IN SEVERAL WIND TUNNELS AND IN FLIGHT AT SUPERSONIC SPEEDS. Albert J. Evans. 1954. ii, 13p. diags., tab. (NACA Rept. 1160. Formerly TN 2944)

ON THE THREE-DIMENSIONAL INSTABILITY OF LAMINAR BOUNDARY LAYERS ON CONCAVE WALLS. (Über eine dreidimensionale Instabilität laminarer Grenzschichten an konkaven Wänden). H. Görtler. June 1954. 32p. diags. (NACA TM 1375. Trans. from Gesellschaft der Wissenschaften zu Göttingen, Nachrichten, Mathematik, v.2, no.1, 1940)

AN EXPLORATORY INVESTIGATION OF SKIN FRICTION AND TRANSITION ON THREE BODIES OF REVOLUTION AT A MACH NUMBER OF 1.61. John H. Hilton, Jr. and K. R. Czarnecki. June 1954. 15p. diags. (NACA TN 3193)

INVESTIGATION OF DISTRIBUTED SURFACE ROUGHNESS ON A BODY OF REVOLUTION AT A MACH NUMBER OF 1.61. K. R. Czarnecki, Ross B. Robinson and John H. Hilton, Jr. June 1954. 35p. diags., photo., 2 tabs. (NACA TN 3230)

HEAT, MASS, AND MOMENTUM TRANSFER FOR FLOW OVER A FLAT PLATE WITH BLOWING OR SUCTION. H. S. Mickley, R. C. Ross, A. L. Squyers and W. E. Stewart, Massachusetts Institute of Technology. July 1954. ii, 149p. diags., photos., 9 tabs. (NACA TN 3208)

EXACT SOLUTIONS OF LAMINAR-BOUNDARY-LAYER EQUATIONS WITH CONSTANT PROPERTY VALUES FOR POROUS WALL WITH VARIABLE TEMPERATURE. Patrick L. Donoughe and John N. B. Livingood. September 1954. 42p. diags., 2 tabs. (NACA TN 3151)



## Laminar Flow - Viscous (Cont.)

EXPERIMENTAL DETERMINATION OF BOUNDARY-LAYER TRANSITION ON A BODY OF REVOLUTION AT  $M = 3.5$ . James R. Jedlicka, Max E. Wilkins and Alvin Seiff. October 1954. 56p. diags., photos. (NACA TN 3342. Formerly RM A53L18)

BOUNDARY-LAYER TRANSITION AT MACH 3.12 WITH AND WITHOUT SINGLE ROUGHNESS ELEMENTS. Paul F. Brinich. December 1954. 41p. diags. (NACA TN 3267)

THEORETICAL AND EXPERIMENTAL INVESTIGATION OF AERODYNAMIC-HEATING AND ISOTHERMAL HEAT-TRANSFER PARAMETERS ON A HEMISPHERICAL NOSE WITH LAMINAR BOUNDARY LAYER AT SUPERSONIC MACH NUMBERS. Howard A. Stine and Kent Wanlass. December 1954. 48p. diags., photo., tab. (NACA TN 3344)

ANALYSIS OF LAMINAR FORCED-CONVECTION HEAT TRANSFER IN ENTRANCE REGION OF FLAT RECTANGULAR DUCTS. E. M. Sparrow. January 1955. 42p. diags. (NACA TN 3331)

SIMILAR SOLUTIONS FOR THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH HEAT TRANSFER AND PRESSURE GRADIENT. Clarence B. Cohen and Eli Reshotko. February 1955. 67p. diags., 2 tabs. (NACA TN 3325)

LAMINAR BOUNDARY LAYER BEHIND SHOCK ADVANCING INTO STATIONARY FLUID. Harold Mirels. March 1955. 25p. diags., 2 tabs. (NACA TN 3401)

THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH FLUID INJECTION. George M. Low. March 1955. 29p. diags., 3 tabs. (NACA TN 3404)

APPARATUS FOR MEASUREMENTS OF TIME AND SPACE CORRELATION. (Appareil de Mesures de la Correlation Dans le Temps et L'Espace). A. Favre, J. Gaviglio and R. Dumas. (Presented at eighth International Congress for Theoretical and Applied Mechanics, Istanbul, Aug., 1952) April 1955. 20p. diags., photos. (NACA TM 1371. Trans. from La Recherche Aéronautique, no. 31, Jan.-Feb., 1953, p. 37-44).

THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH HEAT TRANSFER AND ARBITRARY PRESSURE GRADIENT. Clarence B. Cohen and Eli Reshotko. April 1955. 43p. diags., 2 tabs. (NACA TN 3326)

A METHOD OF QUADRATURE FOR CALCULATION OF THE LAMINAR AND TURBULENT BOUNDARY LAYER IN CASE OF PLANE AND ROTATIONALLY SYMMETRICAL FLOW. (Ein Quadraturverfahren zur Berechnung der laminaren und turbulenten Reibungsschicht bei ebener und rotationssymmetrischer Strömung). E. Truckenbrodt. May 1955. 40p. diags. (NACA TM 1379. Trans. from Ingenieur-Archiv, v. 20, no. 4, 1952, p. 16-228).

SEPARATION, STABILITY, AND OTHER PROPERTIES OF COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH PRESSURE GRADIENT AND HEAT TRANSFER. Morris Morduchow and Richard G. Grape. Polytechnic Institute of Brooklyn. May 1955. 45p. diags., 6 tabs. (NACA TN 3296)

## TURBULENT FLOW (1.1.3.2)

AN 8-FOOT AXISYMMETRICAL FIXED NOZZLE FOR SUBSONIC MACH NUMBERS UP TO 0.99 AND FOR A SUPERSONIC MACH NUMBER OF 1.2. Virgil S. Ritchie, Ray H. Wright and Marshall P. Tulin. February 23, 1950. 52p. diags., photos., 2 tabs. (NACA RM L50A03a)

INVESTIGATION OF A SIMPLE DEVICE FOR PREVENTING SEPARATION DUE TO SHOCK AND BOUNDARY-LAYER INTERACTION. Coleman duP. Donaldson. November 29, 1950. 34p. diags., photos. (NACA RM L50B02a)

INVESTIGATION AT SUPERSONIC SPEEDS OF SOME OF THE FACTORS AFFECTING THE FLOW OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 2, 1951. 111p. diags., photos. (NACA RM L50J18)

EFFECTS OF SEVERAL ARRANGEMENTS OF RECTANGULAR VORTEX GENERATORS ON THE STATIC-PRESSURE RISE THROUGH A SHORT 2:1 DIFFUSER. E. Floyd Valentine and Raymond B. Carroll. February 20, 1951. 35p. diags., photos. (NACA RM L50L04)

AVERAGE SKIN-FRICTION COEFFICIENTS FROM BOUNDARY-LAYER MEASUREMENTS IN FLIGHT ON A PARABOLIC BODY OF REVOLUTION (NACA RM-10) AT SUPERSONIC SPEEDS AND AT LARGE REYNOLDS NUMBERS. Charles B. Rumsey and J. Dan Loposer. March 7, 1951. 33p. diags., photo. (NACA RM L51B12)

A PRELIMINARY INVESTIGATION OF COMBUSTION WITH ROTATING FLOW IN AN ANNULAR COMBUSTION CHAMBER. Ira R. Schwartz. September 1951. 18p. diags., photos. (NACA RM L51E25a)

PRELIMINARY INVESTIGATION OF THE EFFECTS OF RECTANGULAR VORTEX GENERATORS ON THE PERFORMANCE OF A SHORT 1.9:1 STRAIGHT-WALL ANNULAR DIFFUSER. Charles C. Wood. October 1951. 27p. diags., photo., tab. (NACA RM L51G09)

PRELIMINARY INVESTIGATION OF THE DRAG CHARACTERISTICS OF THE NACA RM-10 MISSILE AT MACH NUMBERS OF 1.40 AND 1.59 IN THE LANGLEY 4- BY 4-FOOT SUPERSONIC TUNNEL. Lowell E. Hasel, Archibald R. Sinclair and Clyde V. Hamilton. April 1952. 49p. diags., photos, 3 tabs. (NACA RM L52A14)

SKIN-FRICTION DRAG AND BOUNDARY-LAYER TRANSITION ON A PARABOLIC BODY OF REVOLUTION (NACA RM-10) AT A MACH NUMBER OF 1.6 IN THE LANGLEY 4- BY 4-FOOT SUPERSONIC PRESSURE TUNNEL. K. R. Czarnecki and Jack E. Marte. May 1952. 24p. diags., photos. (NACA RM L52C24)

HEAT TRANSFER AND SKIN FRICTION FOR TURBULENT BOUNDARY LAYERS ON HEATED OR COOLED SURFACES AT HIGH SPEEDS. Coleman duP. Donaldson. October 1952. 20p. diagr., 3 tabs. (NACA RM L52H04)

INVESTIGATION OF THE VARIATION WITH REYNOLDS NUMBER OF THE BASE, WAVE, AND SKIN-FRICTION DRAG OF A PARABOLIC BODY OF REVOLUTION (NACA RM-10) AT MACH NUMBERS OF 1.62, 1.93, AND 2.41 IN THE LANGLEY 9-INCH SUPERSONIC TUNNEL. Eugene S. Love, Donald E. Coletti and August F. Bromm, Jr. October 1952. 62p. diags., photos., (NACA RM L52H21)



# AERODYNAMICS

## 10 FUNDAMENTAL (1.1)

### Turbulent Flow - Viscous (Cont.)

THE EFFECTS OF A SMALL JET OF AIR EXHAUSTING FROM THE NOSE OF A BODY OF REVOLUTION IN SUPERSONIC FLOW. Eugene S. Love. November 1952. 45p. diagrs., photos. (NACA RM L52I19a)

DIFFUSION OF HEAT FROM A LINE SOURCE IN ISOTROPIC TURBULENCE. Mahinder S. Uberoi and Stanley Corrsin, Johns Hopkins University. 1953, ii, 29p. diagrs., photos., tab. (NACA Rept. 1142. Formerly TN 2710)

AVERAGE SKIN-FRICTION COEFFICIENTS FROM BOUNDARY-LAYER MEASUREMENTS ON A OGIVE-CYLINDER BODY IN FLIGHT AT SUPERSONIC SPEEDS. J. Dan Lopper. January 1953. 11p. diagrs., photo. (NACA RM L52K28a)

THE ZERO-LIFT DRAG OF A SLENDER BODY OF REVOLUTION (NACA RM-10 RESEARCH MODEL) AS DETERMINED FROM TESTS IN SEVERAL WIND TUNNELS AND IN FLIGHT AT SUPERSONIC SPEEDS. Albert J. Evans. 1954. ii, 13p. diagrs., tab. (NACA Rept. 1160. Formerly TN 2944)

AVERAGE SKIN-FRICTION DRAG COEFFICIENTS FROM TANK TESTS OF A PARABOLIC BODY OF REVOLUTION (NACA RM-10). Elmo J. Mottard and J. Dan Lopper. 1954. ii, 7p. diagrs., photos. (NACA Rept. 1161. Formerly TN 2854)

CONVECTION OF A PATTERN OF VORTICITY THROUGH A SHOCK WAVE. H. S. Ribner. 1954. ii, 17p. diagrs. (NACA Rept. 1164. Formerly TN 2864)

UNSTEADY OBLIQUE INTERACTION OF A SHOCK WAVE WITH A PLANE DISTURBANCE. Franklin K. Moore. 1954. ii, 21p. diagrs. (NACA Rept. 1165. Formerly TN 2879)

SECONDARY FLOWS AND BOUNDARY-LAYER ACCUMULATIONS IN TURBINE NOZZLES. Harold E. Rohlik, Milton G. Kofskey, Hubert W. Allen and Howard Z. Herzig. 1954. ii, 32p. diagrs., photos., 3 tabs. (NACA Rept. 1168. Formerly TN 2871; TN 2909; TN 2989)

PRELIMINARY MEASUREMENTS OF TURBULENCE AND TEMPERATURE FLUCTUATIONS BEHIND A HEATED GRID. A. L. Kistler, V. O'Brien and S. Corrsin, Johns Hopkins University. June 1954. 24p. diagrs., photo. (NACA RM 54D19)

AN EXPLORATORY INVESTIGATION OF SKIN FRICTION AND TRANSITION ON THREE BODIES OF REVOLUTION AT A MACH NUMBER OF 1.61. John H. Hilton, Jr. and K. R. Czarnecki. June 1954. 15p. diagrs. (NACA TN 3193)

MEASUREMENT OF HEAT TRANSFER IN THE TURBULENT BOUNDARY LAYER ON A FLAT PLATE IN SUPERSONIC FLOW AND COMPARISON WITH SKIN-FRICTION RESULTS. C. C. Pappas. June 1954. 32p. diagrs., tab. (NACA TN 3222)

INVESTIGATION OF DISTRIBUTED SURFACE ROUGHNESS ON A BODY OF REVOLUTION AT A MACH NUMBER OF 1.61. K. R. Czarnecki, Ross B. Robinson and John H. Hilton, Jr. June 1954. 35p. diagrs., photo., 2 tabs. (NACA TN 3230)

A NEW HODOGRAPH FOR FREE-STREAMLINE THEORY. Anatol Roshko, California Institute of Technology. July 1954. 39p. diagrs., 3 tabs. (NACA TN 3168)

ON THE DRAG AND SHEDDING FREQUENCY OF TWO-DIMENSIONAL BLUFF BODIES. Anatol Roshko, California Institute of Technology. July 1954. 29p. diagrs., tab. (NACA TN 3169)

CHARACTERISTICS OF TURBULENCE IN A BOUNDARY LAYER WITH ZERO PRESSURE GRADIENT. P. S. Klebanoff, National Bureau of Standards. July 1954. 56p. diagrs. (NACA TN 3178)

HEAT, MASS, AND MOMENTUM TRANSFER FOR FLOW OVER A FLAT PLATE WITH BLOWING OR SUCTION. H. S. Mickley, R. C. Ross, A. L. Squyers and W. E. Stewart, Massachusetts Institute of Technology. July 1954. ii, 149p. diagrs., photos., 9 tabs. (NACA TN 3208)

SHOCK-TURBULENCE INTERACTION AND THE GENERATION OF NOISE. H. S. Ribner. July 1954. 60p. diagrs., tab. (NACA TN 3255)

EXAMINATION OF THE EXISTING DATA ON THE HEAT TRANSFER OF TURBULENT BOUNDARY LAYERS AT SUPERSONIC SPEEDS FROM THE POINT OF VIEW OF REYNOLDS ANALOGY. Alvin Seiff. August 1954. 38p. diagrs., tab. (NACA TN 3284)

HEAT TRANSFER FROM A HEMISPHERE-CYLINDER EQUIPPED WITH FLOW-SEPARATION SPIKES. Jackson R. Stalder and Helmer V. Nielsen. September 1954. 29p. diagrs., photos. (NACA TN 3287)

TURBULENT-HEAT-TRANSFER MEASUREMENTS AT A MACH NUMBER OF 3.03. Maurice J. Brevoort and Bernard Rashis. September 1954. 21p. diagrs., tab. (NACA TN 3303)

EXPERIMENTAL DETERMINATION OF BOUNDARY-LAYER TRANSITION ON A BODY OF REVOLUTION AT  $M = 3.5$ . James R. Jedlicka, Max E. Wilkins and Alvin Seiff. October 1954. 56p. diagrs., photos. (NACA TN 3342. Formerly RM A53L18)

BOUNDARY-LAYER TRANSITION AT MACH 3.12 WITH AND WITHOUT SINGLE ROUGHNESS ELEMENTS. Paul F. Brinich. December 1954. 41p. diagrs. (NACA TN 3267)

AN ANALYTICAL ESTIMATION OF THE EFFECT OF TRANSPIRATION COOLING ON THE HEAT-TRANSFER AND SKIN-FRICTION CHARACTERISTICS OF A COMPRESSIBLE TURBULENT BOUNDARY LAYER. Morris W. Rubesin. December 1954. 56p. diagrs. (NACA TN 3341)

STUDY OF THE MOMENTUM DISTRIBUTION OF TURBULENT BOUNDARY LAYERS IN ADVERSE PRESSURE GRADIENTS. Virgil A. Sandborn and Raymond J. Slogar. January 1955. 79p. diagrs., photos. (NACA TN 3264)

EXPERIMENTAL EVALUATION OF MOMENTUM TERMS IN TURBULENT PIPE FLOW. Virgil A. Sandborn. January 1955. 40p. diagrs. (NACA TN 3266)

SOME MEASUREMENTS OF TIME AND SPACE CORRELATION IN WIND TUNNEL. (Quelques Mesures de Corrélation Dans le Temps et L'Espace en Soufflerie). A. Favre, J. Gaviglio and R. Dumas. February 1955. 21p. diagrs. (NACA TM 1370. Trans. from La Recherche Aéronautique, no. 32, Mar.-Apr., 1953, p. 21-28).



## Turbulent Flow - Viscous (Cont.)

EXPERIMENTS ON TURBULENT FLOW THROUGH CHANNELS HAVING POROUS ROUGH SURFACES WITH OR WITHOUT AIR INJECTION. E. R. G. Eckert, Anthony J. Diaguila and Patrick L. Donoughe. February 1955. 45p. diagrs., photos., tab. (NACA TN 3339)

TURBULENT-HEAT-TRANSFER MEASUREMENTS AT A MACH NUMBER OF 2.06. Maurice J. Brevoort and Bernard Rashis. March 1955. 20p. diagrs., tab. (NACA TN 3374)

FREE-FLIGHT MEASUREMENTS OF TURBULENT-BOUNDARY-LAYER SKIN FRICTION IN THE PRESENCE OF SEVERE AERODYNAMIC HEATING AT MACH NUMBERS FROM 2.8 TO 7.0. Simon C. Sommer and Barbara J. Short. March 1955. 47p. diagrs., photos., 2 tabs. (NACA TN 3391)

INVESTIGATION OF THE TURBULENT BOUNDARY LAYER ON A YAWED FLAT PLATE. Harry Ashkenas and Frederick R. Riddell, Cornell University. April 1955. 57p. diagrs., photos. (NACA TN 3383)

A SELF-EXCITED, ALTERNATING-CURRENT, CONSTANT-TEMPERATURE HOT-WIRE ANEMOMETER. Charles E. Shepard. April 1955. 29p. diagrs., photos. (NACA TN 3406)

A METHOD OF QUADRATURE FOR CALCULATION OF THE LAMINAR AND TURBULENT BOUNDARY LAYER IN CASE OF PLANE AND ROTATIONALLY SYMMETRICAL FLOW. (Ein Quadraturverfahren zur Berechnung der laminaren und turbulenten Reibungsschicht bei ebener und rotationssymmetrischer Strömung). E. Truckenbrodt. May 1955. 40p. diagrs. (NACA TM 1379. Trans. from Ingenieur-Archiv, v. 20, no. 4, 1952, p. 16-228).

ANALYSIS OF FULLY DEVELOPED TURBULENT HEAT TRANSFER AND FLOW IN AN ANNULUS WITH VARIOUS ECCENTRICITIES. Robert G. Deissler and Maynard F. Taylor. May 1955. 42p. diagrs. (NACA TN 3451)

LONGITUDINAL TURBULENT SPECTRUM SURVEY OF BOUNDARY LAYERS IN ADVERSE PRESSURE GRADIENTS. Virgil A. Sandborn and Raymond J. Slogar. May 1955. 40p. diagrs., tab. (NACA TN 3453)

EFFECT OF A DISCONTINUITY ON TURBULENT BOUNDARY-LAYER-THICKNESS PARAMETERS WITH APPLICATION TO SHOCK-INDUCED SEPARATION. Eli Reshotko and Maurice Tucker. May 1955. 21p. diagrs. (NACA TN 3454)

## JET MIXING

### (1.1.3.3)

VELOCITY AND TEMPERATURE FIELDS IN CIRCULAR JET EXPANDING FROM CHOKED NOZZLE INTO QUIESCENT AIR. Morris D. Rousso and Fred D. Kochendorfer. July 1951. 34p. diagrs., photos. (NACA RM E51F18. Formerly RM E50E03a)

THE EFFECTS OF A SMALL JET OF AIR EXHAUSTING FROM THE NOSE OF A BODY OF REVOLUTION IN SUPERSONIC FLOW. Eugene S. Love. November 1952. 45p. diagrs., photos. (NACA RM L52119a)

THE NEAR NOISE FIELD OF STATIC JETS AND SOME MODEL STUDIES OF DEVICES FOR NOISE REDUCTION. Leslie W. Lassiter and Harvey H. Hubbard. July 1954. 38p. diagrs., photos. (NACA TN 3187)

STARTING AND OPERATING LIMITS OF TWO SUPERSONIC WIND TUNNELS UTILIZING AUXILIARY AIR INJECTION DOWNSTREAM OF THE TEST SECTION. Henry R. Hunczak and Morris D. Rousso. September 1954. 28p. diagrs., photo. (NACA TN 3262)

APPROXIMATE EFFECT OF LEADING-EDGE THICKNESS, INCIDENCE ANGLE, AND INLET MACH NUMBER ON INLET LOSSES FOR HIGH-SOLIDITY CASCADES OF LOW CAMBERED BLADES. Linwood C. Wright. December 1954. 38p. diagrs. (NACA TN 3327)

THEORY OF THE JET SYPHON. B. Szczeniowski, University of Montreal. May 1955. 49p. diagrs., 3 tabs. (NACA TN 3385)

## AERODYNAMICS WITH HEAT

### (1.1.4)

METHOD FOR RAPID DETERMINATION OF PRESSURE CHANGE FOR ONE-DIMENSIONAL FLOW WITH HEAT TRANSFER, FRICTION, ROTATION, AND AREA CHANGE. James E. Hubbart, Henry O. Slone and Vernon L. Arne. June 1954. 22p. diagrs., 2 tabs. (NACA TN 3150)

EXPERIMENTAL INVESTIGATION OF TEMPERATURE RECOVERY FACTORS ON A  $10^\circ$  CONE AT ANGLE OF ATTACK AT A MACH NUMBER OF 3.12. John R. Jack and Barry Moskowitz. July 1954. 15p. diagrs. (NACA TN 3256)

TRANSVERSE OSCILLATIONS IN A CYLINDRICAL COMBUSTION CHAMBER. Franklin K. Moore and Stephen H. Maslen. October 1954. 25p. diagrs. (NACA TN 3152)

THEORETICAL AND EXPERIMENTAL INVESTIGATION OF AERODYNAMIC-HEATING AND ISOTHERMAL HEAT-TRANSFER PARAMETERS ON A HEMISPHERICAL NOSE WITH LAMINAR BOUNDARY LAYER AT SUPERSONIC MACH NUMBERS. Howard A. Stine and Kent Wanlass. December 1954. 48p. diagrs., photo., tab. (NACA TN 3344)

ONE-DIMENSIONAL CALCULATION OF FLOW IN A ROTATING PASSAGE WITH EJECTION THROUGH A POROUS WALL. E. R. G. Eckert, John N. B. Livingood and Ernst I. Prasse. March 1955. 29p. diagrs., photo. (NACA TN 3408)

EFFECT OF DISSOCIATION ON THERMODYNAMIC PROPERTIES OF PURE DIATOMIC GASES. Harold W. Woolley, National Bureau of Standards. April 1955. 19p. diagrs., tab. (NACA TN 3270)

## HEATING

### (1.1.4.1)

AN EXPLORATORY INVESTIGATION OF SKIN FRICTION AND TRANSITION ON THREE BODIES OF REVOLUTION AT A MACH NUMBER OF 1.61. John H. Hilton, Jr. and K. R. Czarnecki. June 1954. 15p. diagrs. (NACA TN 3193)

MEASUREMENT OF HEAT TRANSFER IN THE TURBULENT BOUNDARY LAYER ON A FLAT PLATE IN SUPERSONIC FLOW AND COMPARISON WITH SKIN-FRICTION RESULTS. C. C. Pappas. June 1954. 32p. diagrs., tab. (NACA TN 3222)



## AERODYNAMICS

### 12 FUNDAMENTAL (1.1)

#### Heating - Aerodynamic (Cont.)

INVESTIGATION OF DISTRIBUTED SURFACE ROUGHNESS ON A BODY OF REVOLUTION AT A MACH NUMBER OF 1.61. K. R. Czarnecki, Ross B. Robinson and John H. Hilton, Jr. June 1954. 35p. diagrs., photo., 2 tabs. (NACA TN 3230)

HEAT TRANSFER FROM A HEMISPHERE-CYLINDER EQUIPPED WITH FLOW-SEPARATION SPIKES. Jackson R. Stalder and Helmer V. Nielsen. September 1954. 29p. diagrs., photos. (NACA TN 3287)

THEORETICAL AND EXPERIMENTAL INVESTIGATION OF AERODYNAMIC-HEATING AND ISOTHERMAL HEAT-TRANSFER PARAMETERS ON A HEMISPHERICAL NOSE WITH LAMINAR BOUNDARY LAYER AT SUPERSONIC MACH NUMBERS. Howard A. Stine and Kent Wanlass. December 1954. 48p. diagrs., photo., tab. (NACA TN 3344)

ICING LIMIT AND WET-SURFACE TEMPERATURE VARIATION FOR TWO AIRFOIL SHAPES UNDER SIMULATED HIGH-SPEED FLIGHT CONDITIONS. Willard D. Coles. February 1955. 33p. diagrs., photos. (NACA TN 3396)

#### HEAT TRANSFER (1.1.4.2)

INVESTIGATION OF POWER REQUIREMENTS FOR ICE PREVENTION AND CYCLICAL DE-ICING OF INLET GUIDE VANES WITH INTERNAL ELECTRIC HEATERS. Uwe von Glahn and Robert E. Blatz. December 1, 1950. 49p. diagrs., photos. (NACA RM E50H29)

ICING CHARACTERISTICS AND ANTI-ICING HEAT REQUIREMENTS FOR HOLLOW AND INTERNALLY MODIFIED GAS-HEATED INLET GUIDE VANES. Vernon H. Gray and Dean T. Bowden. December 5, 1950. 49p. diagrs., photos. (NACA RM E50I08)

CORRELATION OF SUPERSONIC CONVECTIVE HEAT-TRANSFER COEFFICIENTS FROM MEASUREMENTS OF THE SKIN TEMPERATURE OF A PARABOLIC BODY OF REVOLUTION (NACA RM-10). Leo T. Chauvin and Carlos A. deMoraes. March 7, 1951. 39p. diagrs., photo. 2 tabs. (NACA RM L51A18)

SKIN-TEMPERATURE TELEMETER FOR DETERMINING BOUNDARY-LAYER HEAT-TRANSFER COEFFICIENTS. Clifford L. Fricke and Francis B. Smith. March 15, 1951. 22p. diagrs. (NACA RM L50J17)

A SUMMARY OF AVAILABLE KNOWLEDGE CONCERNING SKIN FRICTION AND HEAT TRANSFER AND ITS APPLICATION TO THE DESIGN OF HIGH-SPEED MISSILES. Morris W. Rubesin, Charles B. Rumsey and Steven A. Varga. November 1951. 17p. diagrs. (NACA RM A51J25a)

EXPERIMENTAL INVESTIGATION OF AIR-FLOW UNIFORMITY AND PRESSURE LEVEL ON WIRE CLOTH FOR TRANSPIRATION-COOLING APPLICATIONS. Patrick L. Donoughe and Roy A. McKinnon. July 1952. 28p. diagrs., photos., tab. (NACA RM E52E16)

HEAT TRANSFER AND SKIN FRICTION FOR TURBULENT BOUNDARY LAYERS ON HEATED OR COOLED SURFACES AT HIGH SPEEDS. Coleman duP. Donaldson. October 1952. 20p. diagrs., 3 tabs. (NACA RM L52H04)

COMPARISON OF EFFECTIVENESS OF CONVECTION-, TRANSPIRATION-, AND FILM-COOLING METHODS WITH AIR AS COOLANT. E. R. G. Eckert and John N. B. Livingood. 1954. ii, 17p. diagrs. (NACA Rept. 1182. Formerly TN 3010)

MEASUREMENT OF HEAT TRANSFER IN THE TURBULENT BOUNDARY LAYER ON A FLAT PLATE IN SUPERSONIC FLOW AND COMPARISON WITH SKIN-FRICTION RESULTS. C. C. Pappas. June 1954. 32p. diagrs., tab. (NACA TN 3222)

HEAT, MASS, AND MOMENTUM TRANSFER FOR FLOW OVER A FLAT PLATE WITH BLOWING OR SUCTION. H. S. Mickley, R. C. Ross, A. L. Squyers and W. E. Stewart, Massachusetts Institute of Technology. July 1954. ii, 149p. diagrs., photos., 9 tabs. (NACA TN 3208)

EXPERIMENTAL INVESTIGATION OF TEMPERATURE RECOVERY FACTORS ON A  $10^\circ$  CONE AT ANGLE OF ATTACK AT A MACH NUMBER OF 3.12. John R. Jack and Barry Moskowitz. July 1954. 15p. diagrs. (NACA TN 3256)

EXAMINATION OF THE EXISTING DATA ON THE HEAT TRANSFER OF TURBULENT BOUNDARY LAYERS AT SUPERSONIC SPEEDS FROM THE POINT OF VIEW OF REYNOLDS ANALOGY. Alvin Seiff. August 1954. 38p. diagrs., tab. (NACA TN 3284)

RECOVERY CORRECTIONS FOR BUTT-WELDED, STRAIGHT-WIRE THERMOCOUPLES IN HIGH-VELOCITY, HIGH-TEMPERATURE GAS STREAMS. Frederick S. Simmons. September 1954. 19p. diagrs. (NACA RM E54G22a)

EXACT SOLUTIONS OF LAMINAR-BOUNDARY-LAYER EQUATIONS WITH CONSTANT PROPERTY VALUES FOR POROUS WALL WITH VARIABLE TEMPERATURE. Patrick L. Donoughe and John N. B. Livingood. September 1954. 42p. diagrs., 2 tabs. (NACA TN 3151)

HEAT TRANSFER FROM A HEMISPHERE-CYLINDER EQUIPPED WITH FLOW-SEPARATION SPIKES. Jackson R. Stalder and Helmer V. Nielsen. September 1954. 29p. diagrs., photos. (NACA TN 3287)

TURBULENT-HEAT-TRANSFER MEASUREMENTS AT A MACH NUMBER OF 3.03. Maurice J. Brevoort and Bernard Rashis. September 1954. 21p. diagrs., tab. (NACA TN 3303)

SHEARING-STRESS MEASUREMENTS BY USE OF A HEATED ELEMENT. H. W. Liepmann and G. T. Skinner, California Institute of Technology. November 1954. 27p. diagrs. (NACA TN 3268)

AN ANALYTICAL ESTIMATION OF THE EFFECT OF TRANSPIRATION COOLING ON THE HEAT-TRANSFER AND SKIN-FRICTION CHARACTERISTICS OF A COMPRESSIBLE TURBULENT BOUNDARY LAYER. Morris W. Rubesin. December 1954. 56p. diagrs. (NACA TN 3341)

THEORETICAL AND EXPERIMENTAL INVESTIGATION OF AERODYNAMIC-HEATING AND ISOTHERMAL HEAT-TRANSFER PARAMETERS ON A HEMISPHERICAL NOSE WITH LAMINAR BOUNDARY LAYER AT SUPERSONIC MACH NUMBERS. Howard A. Stine and Kent Wanlass. December 1954. 48p. diagrs., photo., tab. (NACA TN 3344)

SIMILAR SOLUTIONS FOR THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH HEAT TRANSFER AND PRESSURE GRADIENT. Clarence B. Cohen and Eli Reshotko. February 1955. 67p. diagrs., 2 tabs. (NACA TN 3325)



## Heat Transfer - Aerodynamic (Cont.)

ICING LIMIT AND WET-SURFACE TEMPERATURE VARIATION FOR TWO AIRFOIL SHAPES UNDER SIMULATED HIGH-SPEED FLIGHT CONDITIONS. Willard D. Coles. February 1955. 33p. diags., photos. (NACA TN 3396)

TURBULENT-HEAT-TRANSFER MEASUREMENTS AT A MACH NUMBER OF 2.06. Maurice J. Brevoort and Bernard Rashis. March 1955. 20p. diags., tab. (NACA TN 3374)

A THEORY FOR PREDICTING THE FLOW OF REAL GASES IN SHOCK TUBES WITH EXPERIMENTAL VERIFICATION. Robert L. Trimpi and Nathaniel B. Cohen. March 1955. 69p. diags., photo. (NACA TN 3375)

FREE-FLIGHT MEASUREMENTS OF TURBULENT-BOUNDARY-LAYER SKIN FRICTION IN THE PRESENCE OF SEVERE AERODYNAMIC HEATING AT MACH NUMBERS FROM 2.8 TO 7.0. Simon C. Sommer and Barbara J. Short. March 1955. 47p. diags., photos., 2 tabs. (NACA TN 3391)

THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH FLUID INJECTION. George M. Low. March 1955. 29p. diags., 3 tabs. (NACA TN 3404)

THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH HEAT TRANSFER AND ARBITRARY PRESSURE GRADIENT. Clarence B. Cohen and Eli Reshotko. April 1955. 43p. diags., 2 tabs. (NACA TN 3326)

ANALYTIC DETERMINATION OF THE DISCHARGE COEFFICIENTS OF FLOW NOZZLES. Frederick S. Simmons. April 1955. 15p. diags. (NACA TN 3447)

SEPARATION, STABILITY, AND OTHER PROPERTIES OF COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH PRESSURE GRADIENT AND HEAT TRANSFER. Morris Morduchow and Richard G. Grape. Polytechnic Institute of Brooklyn. May 1955. 45p. diags., 6 tabs. (NACA TN 3296)

## ADDITIONS OF HEAT (1.1.4.3)

A PRELIMINARY INVESTIGATION OF COMBUSTION WITH ROTATING FLOW IN AN ANNULAR COMBUSTION CHAMBER. Ira R. Schwartz. September 1951. 18p. diags., photos. (NACA RM L51E25a)

PRESSURE DISTRIBUTION AND AERODYNAMIC COEFFICIENTS ASSOCIATED WITH HEAT ADDITION TO SUPERSONIC AIR STREAM ADJACENT TO TWO-DIMENSIONAL SUPERSONIC WING. I. Irving Pinkel, John S. Serafini and John L. Gregg. February 1952. 33p. diags., tab. (NACA RM E51K26)

AN ANALYSIS OF BUZZING IN SUPERSONIC RAM JETS BY A MODIFIED ONE-DIMENSIONAL NON-STATIONARY WAVE THEORY. Robert L. Trimpi. March 1952. 72p. diags., photos. (NACA RM L52A18)

DIFFUSION OF HEAT FROM A LINE SOURCE IN ISOTROPIC TURBULENCE. Mahinder S. Uberoi and Stanley Corrsin, Johns Hopkins University. 1953, ii, 29p. diags., photos., tab. (NACA Rept. 1142. Formerly TN 2710)

PRELIMINARY MEASUREMENTS OF TURBULENCE AND TEMPERATURE FLUCTUATIONS BEHIND A HEATED GRID. A. L. Kistler, V. O'Brien and S. Corrsin, Johns Hopkins University. June 1954. 24p. diags., photo. (NACA RM 54D19)

HEAT, MASS, AND MOMENTUM TRANSFER FOR FLOW OVER A FLAT PLATE WITH BLOWING OR SUCTION. H. S. Mickley, R. C. Ross, A. L. Squyers and W. E. Stewart, Massachusetts Institute of Technology. July 1954. ii, 149p. diags., photos., 9 tabs. (NACA TN 3208)

EXPERIMENTAL HEAT-TRANSFER AND FRICTION COEFFICIENTS FOR AIR FLOWING THROUGH STACKS OF PARALLEL FLAT PLATES. Eldon W. Sams and Walter F. Weiland, Jr. August 1954. 33p. diags., photo., tab. (NACA RM E54F11)

KINETIC TREATMENT OF THE NUCLEATION IN SUPERSATURATED VAPORS. (Kinetische Behandlung der Keimbildung in übersättigten Dämpfen). R. Becker and W. Döring. September 1954. 43p. diags. (NACA TM 1374. Trans. from Annalen der Physik, Ser. 5, v. 24, 1935, p. 719-752).

THEORETICAL AND EXPERIMENTAL INVESTIGATION OF AERODYNAMIC-HEATING AND ISOTHERMAL HEAT-TRANSFER PARAMETERS ON A HEMISPHERICAL NOSE WITH LAMINAR BOUNDARY LAYER AT SUPERSONIC MACH NUMBERS. Howard A. Stine and Kent Wanlass. December 1954. 48p. diags., photo., tab. (NACA TN 3344)

A THEORY FOR PREDICTING THE FLOW OF REAL GASES IN SHOCK TUBES WITH EXPERIMENTAL VERIFICATION. Robert L. Trimpi and Nathaniel B. Cohen. March 1955. 69p. diags., photo. (NACA TN 3375)

INTERACTION OF A FREE FLAME FRONT WITH A TURBULENCE FIELD. Maurice Tucker. March 1955. 55p. diags., 2 tabs. (NACA TN 3407)

## FLOW OF RAREFIED GASES (1.1.5)

VISCOSITY CORRECTIONS TO CONE PROBES IN RAREFIED SUPERSONIC FLOW AT A NOMINAL MACH NUMBER OF 4. L. Talbot, University of California. November 1954. 39p. diags., photo., 4 tabs. (NACA TN 3219)

## Wings (1.2)

### WING SECTIONS

#### (1.2.1)

WING-FLOW INVESTIGATION OF THE CHARACTERISTICS OF SEVEN UNSWEPT, UNTAPERED AIRFOILS OF ASPECT RATIO 8.0. Harold L. Crane and James J. Adams. June 13, 1951. 54p. diagrs., photo. (NACA RM L51D24a)

EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF VORTEX GENERATORS ON THE MAXIMUM LIFT OF A 6-PERCENT-THICK SYMMETRICAL CIRCULAR-ARC AIRFOIL SECTION. William J. Bursnall. October 1952. 16p. diagrs., 2 tabs. (NACA RM L52G24)

### SECTION THEORY

#### (1.2.1.1)

THE SUBSONIC AERODYNAMIC CHARACTERISTICS OF TWO DOUBLE-WEDGE AIRFOIL SECTIONS SUITABLE FOR SUPERSONIC FLIGHT. Joseph Solomon and Floyd W. Henney. May 12, 1947. 33p. diagrs., photos. (NACA RM A6G24)

APPLICATION OF ONE PART OF VON KARMAN'S TWO-DIMENSIONAL TRANSONIC SIMILARITY LAW TO DRAG DATA OF NACA 65-SERIES WINGS. Kenneth B. Amer. August 24, 1948. 9p. diagrs. (NACA RM L8F24)

INVESTIGATION AT MACH NUMBER 1.62 OF THE PRESSURE DISTRIBUTION OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 25, 1950. 81p. diagrs., photos. (NACA RM L9J05)

INVESTIGATION AT SUPERSONIC SPEEDS OF SOME OF THE FACTORS AFFECTING THE FLOW OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 2, 1951. 111p. diagrs., photos. (NACA RM L50J18)

ON THE APPLICATION OF TRANSONIC SIMILARITY RULES TO WINGS OF FINITE SPAN. John R. Spreiter. 1953. ii, 21p. diagrs. (NACA Rept. 1153. Formerly TN 2726)

THEORETICAL STUDY OF THE TRANSONIC LIFT OF A DOUBLE-WEDGE PROFILE WITH DETACHED BOW WAVE. Walter G. Vincenti and Cleo B. Wagoner. (Portions of this work were reported at the eighth International Congress on Theoretical and Applied Mechanics, Istanbul, Turkey, August 20-28, 1952). 1954. ii, 24p. diagrs., 2 tabs. (NACA Rept. 1180. Formerly TN 2832)

TABLES FOR THE COMPUTATION OF WAVE DRAG OF ARROW WINGS OF ARBITRARY AIRFOIL SECTION. Frederick C. Grant and Morton Cooper. June 1954. 9p. diagrs., 28p. tabs. (in pocket) (NACA TN 3185)

STUDY OF THE SUBSONIC FORCES AND MOMENTS ON AN INCLINED PLATE OF INFINITE SPAN. Bradford H. Wick. June 1954. 25p. diagrs. (NACA TN 3221)

AN EXPERIMENTAL STUDY OF THE LIFT AND PRESSURE DISTRIBUTION ON A DOUBLE-WEDGE PROFILE AT MACH NUMBERS NEAR SHOCK ATTACHMENT. Walter G. Vincenti, Duane W. Dugan and E. Ray Phelps. July 1954. 43p. diagrs. (NACA TN 3225)

AN INVESTIGATION OF A LIFTING 10-PERCENT-THICK SYMMETRICAL DOUBLE-WEDGE AIRFOIL AT MACH NUMBERS UP TO 1. Milton D. Humphreys. November 1954. 35p. diagrs., photos., tab. (NACA TN 3306)

SUBSONIC EDGES IN THIN-WING AND SLENDER-BODY THEORY. Milton D. Van Dyke. November 1954. 26p. diagrs. (NACA TN 3343)

DESCRIPTION AND ANALYSIS OF A ROCKET-VEHICLE EXPERIMENT ON FLUTTER INVOLVING WING DEFORMATION AND BODY MOTIONS. H. J. Cunningham and R. R. Lundstrom. January 1955. 26p. diagrs., photos., 2 tabs. (NACA TN 3311. Formerly RM L50I29)

SOME CONSIDERATIONS ON TWO-DIMENSIONAL THIN AIRFOILS DEFORMING IN SUPERSONIC FLOW. Eugene Migotsky. January 1955. 36p. diagrs. (NACA TN 3386)

LIFT ON A BENT, FLAT PLATE. (Auftrieb einer geknickten ebenen Platte). F. Keune. February 1955. 15p. diagrs. (NACA TM 1340. Trans. from Bericht der Aerodynamischer Versuchsanstalt Göttingen. Luftfahrtforschung, Mar. 20, 1936, Annual Volume, p. 85-87)

SECOND-ORDER SUBSONIC AIRFOIL-SECTION THEORY AND ITS PRACTICAL APPLICATION. Milton D. Van Dyke. March 1955. 50p. diagrs., 5 tabs. (NACA TN 3390)

### SECTION VARIABLES

#### (1.2.1.2)

PRESSURE-DISTRIBUTION DATA FOR THE NACA 64<sub>1</sub>-012 AND 64<sub>1</sub>A012 AIRFOILS AT HIGH SUBSONIC MACH NUMBERS. Milton D. Humphreys. May 6, 1949. 37p. photos., diagrs., 8 tabs. (NACA RM L9C18)

EXPLORATORY INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF TWO EXPERIMENTAL 6-PERCENT-THICK AIRFOIL SECTIONS DESIGNED TO HAVE HIGH MAXIMUM LIFT COEFFICIENTS. Laurence K. Loftin, Jr. and Albert E. von Doenhoff. December 1951. 48p. diagrs., photo., 2 tabs. (NACA RM L51F06)



## Section Variables - Wing Sections (Cont.)

AERODYNAMIC CHARACTERISTICS OF THE NACA 64-010 AND 0010-1.10 40/1.051 AIRFOIL SECTIONS AT MACH NUMBERS FROM 0.30 TO 0.85 AND REYNOLDS NUMBERS FROM  $4.0 \times 10^6$  TO  $8.0 \times 10^6$ . Laurence K. Loftin, Jr. August 1954. 17p. diags., tab. (NACA TN 3244)

AN INVESTIGATION OF A LIFTING 10-PERCENT-THICK SYMMETRICAL DOUBLE-WEDGE AIRFOIL AT MACH NUMBERS UP TO 1. Milton D. Humphreys. November 1954. 35p. diags., photos., tab. (NACA TN 3306)

### Camber

#### (1.2.1.2.1)

WING-FLOW INVESTIGATION OF THE CHARACTERISTICS OF SEVEN UNSWEPT, UNTAPERED AIRFOILS OF ASPECT RATIO 8.0. Harold L. Crane and James J. Adams. June 13, 1951. 54p. diags., photo. (NACA RM L51D24a)

SMALL-SCALE TRANSONIC INVESTIGATION OF THE EFFECTS OF PARTIAL-SPAN LEADING-EDGE CAMBER ON THE AERODYNAMIC CHARACTERISTICS OF A  $50^\circ 38'$  SWEPTBACK WING OF ASPECT RATIO 2.98. William J. Alford, Jr. and Andrew L. Byrnes, Jr. June 1952. 28p. diags., photo., tab. (NACA RM L52D08a)

THE EFFECTS OF CAMBER AND LEADING-EDGE-FLAP DEFLECTION ON THE PRESSURE PULSATIONS ON THIN RIGID AIRFOILS AT TRANSONIC SPEEDS. Milton D. Humphreys and John D. Kent. October 1952. 26p. diags., photos., tab. (NACA RM L52G22)

EFFECT OF THICKNESS, CAMBER, AND THICKNESS DISTRIBUTION ON AIRFOIL CHARACTERISTICS AT MACH NUMBERS UP TO 1.0. Bernard N. Daley and Richard S. Dick. October 1952. 76p. photos., diags., tab. (NACA RM L52G31a)

DESIGN CONSIDERATIONS FOR WINGS HAVING MINIMUM DRAG DUE TO LIFT. Warren A. Tucker. December 1954. 26p. diags. (NACA TN 3317)

### Thickness

#### (1.2.1.2.2)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEPT-BACK TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. John A. Zalovcik and Richard H. Sawyer. March 28, 1947. 30p. diags., photos., tab. (NACA RM L6K21)

THE SUBSONIC AERODYNAMIC CHARACTERISTICS OF TWO DOUBLE-WEDGE AIRFOIL SECTIONS SUITABLE FOR SUPERSONIC FLIGHT. Joseph Solomon and Floyd W. Henney. May 12, 1947. 33p. diags., photos. (NACA RM A6G24)

MEASUREMENTS OF THE EFFECTS OF THICKNESS RATIO AND ASPECT RATIO ON THE DRAG OF RECTANGULAR-PLAN-FORM AIRFOILS AT TRANSONIC SPEEDS. Jim Rogers Thompson and Charles W. Mathews. June 20, 1947. 17p. diags., photo. (NACA RM L7E08)

APPLICATION OF ONE PART OF VON KARMAN'S TWO-DIMENSIONAL TRANSONIC SIMILARITY LAW TO DRAG DATA OF NACA 65-SERIES WINGS. Kenneth B. Amer. August 24, 1948. 9p. diags. (NACA RM L8F24)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.25 OF A 6-PERCENT-THICK TRIANGULAR WING AND 6- AND 9-PERCENT-THICK TRIANGULAR WINGS IN COMBINATION WITH A FUSELAGE. WING ASPECT RATIO 2.31, BICONVEX AIRFOIL SECTIONS. Albert W. Hall and Garland J. Morris. May 5, 1950. 22p. diags., photo., 2 tabs. (NACA RM L50D05)

RESULTS OF FLIGHT TESTS TO DETERMINE THE ZERO-LIFT DRAG CHARACTERISTICS OF A  $60^\circ$  DELTA WING WITH NACA 65-006 AIRFOIL SECTION AND VARIOUS DOUBLE-WEDGE SECTIONS AT MACH NUMBERS FROM 0.7 TO 1.6. Clement J. Welsh. August 11, 1950. 15p. diags., photo. (NACA RM L50F01)

DAMPING IN ROLL OF RECTANGULAR WINGS OF SEVERAL ASPECT RATIOS AND NACA 65A-SERIES AIRFOIL SECTIONS OF SEVERAL THICKNESS RATIOS AT TRANSONIC AND SUPERSONIC SPEEDS AS DETERMINED WITH ROCKET-POWERED MODELS. James L. Edmondson. August 24, 1950. 16p. diags. (NACA RM L50E26)

INVESTIGATION AT SUPERSONIC SPEEDS OF SOME OF THE FACTORS AFFECTING THE FLOW OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 2, 1951. 111p. diags., photos. (NACA RM L50J18)

PRESSURE PULSATIONS ON RIGID AIRFOILS AT TRANSONIC SPEEDS. Milton D. Humphreys. December 1951. 21p. diags., photos., tab. (NACA RM L51I12)

THE EFFECTS ON THE AERODYNAMIC CHARACTERISTICS OF VARYING THE WING THICKNESS RATIO OF A TRIANGULAR WING-BODY CONFIGURATION AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Albert W. Hall and James M. McKay. April 1952. 27p. diags., photo., 2 tabs. (NACA RM L52B18)

EFFECT OF THICKNESS, CAMBER, AND THICKNESS DISTRIBUTION ON AIRFOIL CHARACTERISTICS AT MACH NUMBERS UP TO 1.0. Bernard N. Daley and Richard S. Dick. October 1952. 76p. photos., diags., tab. (NACA RM L52G31a)

THEORETICAL STUDY OF THE TRANSONIC LIFT OF A DOUBLE-WEDGE PROFILE WITH DETACHED BOW WAVE. Walter G. Vincenti and Cleo B. Wagöner. (Portions of this work were reported at the eighth International Congress on Theoretical and Applied Mechanics, Istanbul, Turkey, August 20-28, 1952). 1954. ii, 24p. diags., 2 tabs. (NACA Rept. 1180. Formerly TN 2832)

AIRFOIL SECTION CHARACTERISTICS AT HIGH ANGLES OF ATTACK. Laurence K. Loftin, Jr. August 1954. 10p. diags. (NACA TN 3241)

GENERAL THEORY OF CONICAL FLOWS AND ITS APPLICATION TO SUPERSONIC AERODYNAMICS. (La théorie générale des mouvements coniques et ses applications à l'aérodynamique supersonique). Paul Germain. PREFACE. M. J. Peres. January 1955. vii, 333p. diags. (NACA TM 1354. Trans. from Office National d'Études et de Recherches Aéronautiques, Pub. 34, 1949)



## AERODYNAMICS

### 16 WINGS (1.2)

#### Thickness Distribution

##### (1.2.1.2.3)

RESULTS OF FLIGHT TESTS TO DETERMINE THE ZERO-LIFT DRAG CHARACTERISTICS OF A 60° DELTA WING WITH NACA 65-006 AIRFOIL SECTION AND VARIOUS DOUBLE-WEDGE SECTIONS AT MACH NUMBERS FROM 0.7 TO 1.6. Clement J. Welsh. August 11, 1950. 15p. diags., photo. (NACA RM L50F01)

LIFT AND MOMENT CHARACTERISTICS AT SUBSONIC MACH NUMBERS OF FOUR 10-PERCENT-THICK AIRFOIL SECTIONS OF VARYING TRAILING-EDGE THICKNESS. James L. Summers and William A. Page. December 20, 1950. 32p. diags., photos. (NACA RM A50J09)

WING-FLOW INVESTIGATION OF THE CHARACTERISTICS OF SEVEN UNSWEPT, UNTAPERED AIRFOILS OF ASPECT RATIO 8.0. Harold L. Crane and James J. Adams. June 13, 1951. 54p. diags., photo. (NACA RM L51D24a)

EFFECT OF TRAILING-EDGE THICKNESS ON LIFT AT SUPERSONIC VELOCITIES. Dean R. Chapman and Robert H. Kester. July 1952. 24p. diags., photos. (NACA RM A52D17)

EFFECT OF THICKNESS, CAMBER, AND THICKNESS DISTRIBUTION ON AIRFOIL CHARACTERISTICS AT MACH NUMBERS UP TO 1.0. Bernard N. Daley and Richard S. Dick. October 1952. 76p. photos., diags., tab. (NACA RM L52G31a)

INFLUENCE OF AIRFOIL TRAILING-EDGE ANGLE AND TRAILING-EDGE-THICKNESS VARIATION ON THE EFFECTIVENESS OF A PLAIN FLAP AT HIGH SUBSONIC MACH NUMBERS. Albert D. Hemenover and Donald J. Graham. June 1954. 101p. diags., photos., 5 tabs. (NACA TN 3174. Formerly RM A51C12a)

TABLES FOR THE COMPUTATION OF WAVE DRAG OF ARROW WINGS OF ARBITRARY AIRFOIL SECTION. Frederick C. Grant and Morton Cooper. June 1954. 9p. diagr., 28p. tabs. (in pocket) (NACA TN 3185)

EXPLORATORY INVESTIGATION OF AN AIRFOIL WITH AREA SUCTION APPLIED TO A POROUS, ROUND TRAILING EDGE FITTED WITH A LIFT-CONTROL VANE. Robert E. Dannenberg and James A. Weiberg. April 1955. 55p. diags., photos., 2 tabs. (NACA TN 3498)

AERODYNAMIC CHARACTERISTICS OF SEVERAL 6-PERCENT-THICK AIRFOILS AT ANGLES OF ATTACK FROM 0° TO 20° AT HIGH SUBSONIC SPEEDS. Bernard N. Daley and Douglas R. Lord. May 1955. 57p. diags., photos. (NACA TN 3424. Formerly RM L9E19)

#### Inlets and Exits

##### (1.2.1.2.4)

THE USE OF SUCTION TO PREVENT SHOCK-INDUCED SEPARATION IN A NOZZLE. James R. Sterrett, Robert W. Dunning and Maurice J. Brevoort. January 30, 1951. 64p. diags., photos., 2 tabs. (NACA RM L50K20)

#### Surface Conditions

##### (1.2.1.2.5)

A PRELIMINARY FLIGHT INVESTIGATION OF THE EFFECTS OF VORTEX GENERATORS ON SEPARATION DUE TO SHOCK. Lindsay J. Lina and Wilmer H. Reed, III. November 30, 1950. 30p. diags., photos., tab. (NACA RM L50J02)

INVESTIGATION AT SUPERSONIC SPEEDS OF SOME OF THE FACTORS AFFECTING THE FLOW OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 2, 1951. 111p. diags., photos. (NACA RM L50J18)

INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF TWO SYMMETRICAL 6-PERCENT-THICK AIRFOIL SECTIONS DESIGNED TO HAVE HIGH MAXIMUM LIFT COEFFICIENTS AT LOW SPEEDS. Nicholas J. Paradiso. October 1952. 37p. diags., photo., 2 tabs. (NACA RM L52I02)

IMPINGEMENT OF WATER DROPLETS ON WEDGES AND DOUBLE-WEDGE AIRFOILS AT SUPERSONIC SPEEDS. John S. Serafini. 1954. ii, 24p. diags. (NACA Rept. 1159. Formerly TN 2971)

IMPINGEMENT OF WATER DROPLETS ON NACA 65A004 AIRFOIL AT 8° ANGLE OF ATTACK. Rinaldo J. Brun, Helen M. Gallagher and Dorothea E. Vogt. July 1954. 27p. diags. (NACA TN 3155)

AIRFOIL SECTION CHARACTERISTICS AT HIGH ANGLES OF ATTACK. Laurence K. Loftin, Jr. August 1954. 10p. diags. (NACA TN 3241)

AERODYNAMIC CHARACTERISTICS OF NACA 0012 AIRFOIL SECTION AT ANGLES OF ATTACK FROM 0° TO 180°. Chris C. Critzos, Harry H. Heyson and Robert W. Boswinkle, Jr. January 1955. 21p. diags. (NACA TN 3361)

A DYE-TRACER TECHNIQUE FOR EXPERIMENTALLY OBTAINING IMPINGEMENT CHARACTERISTICS OF ARBITRARY BODIES AND A METHOD FOR DETERMINING DROPLET SIZE DISTRIBUTION. Uwe H. von Glahn, Thomas F. Gelder and William H. Smyers, Jr. March 1955. 73p. diags., photos., tab. (NACA TN 3338)

#### DESIGNATED PROFILES

##### (1.2.1.3)

DRAG MEASUREMENTS OF A 34° SWEEP-FORWARD AND SWEEP-BACK NACA 65-009 AIRFOIL OF ASPECT RATIO 2.7 AS DETERMINED BY FLIGHT TESTS AT SUPERSONIC SPEEDS. Sidney R. Alexander. February 20, 1947. 11p. diags., photos. (NACA RM L6111)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEEP-BACK TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. John A. Zalovcik and Richard H. Sawyer. March 28, 1947. 30p. diags., photos., tab. (NACA RM L6K21)

DRAG MEASUREMENTS OF A SWEEP-BACK WING HAVING INVERSE TAPER AS DETERMINED BY FLIGHT TESTS AT SUPERSONIC SPEEDS. Sidney R. Alexander. April 8, 1947. 12p. diags., photo. (NACA RM L6L30)

OBSERVATIONS ON AN AILERON-FLUTTER INSTABILITY ENCOUNTERED ON A 45° SWEEP-BACK WING IN TRANSONIC AND SUPERSONIC FLIGHT. Marvin Pitkin, William N. Gardner and Howard J. Curfman, Jr. April 11, 1947. 23p. diags., photos. (NACA RM L6L09)

THE SUBSONIC AERODYNAMIC CHARACTERISTICS OF TWO DOUBLE-WEDGE AIRFOIL SECTIONS SUITABLE FOR SUPERSONIC FLIGHT. Joseph Solomon and Floyd W. Henney. May 12, 1947. 33p. diags., photos. (NACA RM A6G24)



## Designated Profiles - Wing Sections (Cont.)

MEASUREMENTS OF THE EFFECTS OF THICKNESS RATIO AND ASPECT RATIO ON THE DRAG OF RECTANGULAR-PLAN-FORM AIRFOILS AT TRANSONIC SPEEDS. Jim Rogers Thompson and Charles W. Mathews. June 20, 1947. 17p. diagrs., photo. (NACA RM L7E08)

REDUCTION OF PROFILE DRAG AT SUPERSONIC VELOCITIES BY THE USE OF AIRFOIL SECTIONS HAVING A BLUNT TRAILING EDGE. Dean R. Chapman. November 1, 1949. 31p. diagrs., photo. (NACA RM A9H11)

FLIGHT INVESTIGATION AT MACH NUMBERS FROM 0.6 to 1.7 TO DETERMINE DRAG AND BASE PRESSURES ON A BLUNT-TRAILING-EDGE AIRFOIL AND DRAG OF DIAMOND AND CIRCULAR-ARC AIRFOILS AT ZERO LIFT. John D. Morrow and Ellis Katz. August 11, 1950. 25p. diagrs., photos. (NACA RM L50E19a)

MEASUREMENTS OF THE EFFECT OF TRAILING-EDGE THICKNESS ON THE ZERO-LIFT DRAG OF THIN LOW-ASPECT-RATIO WINGS. John D. Morrow. August 14, 1950. 12p. diagrs., photo. (NACA RM L50F26)

LIFT AND MOMENT CHARACTERISTICS AT SUBSONIC MACH NUMBERS OF FOUR 10-PERCENT-THICK AIRFOIL SECTIONS OF VARYING TRAILING-EDGE THICKNESS. James L. Summers and William A. Page. December 20, 1950. 32p. diagrs., photos. (NACA RM A50J09)

WING-FLOW INVESTIGATION OF THE CHARACTERISTICS OF SEVEN UNSWEPT, UNTAPERED AIRFOILS OF ASPECT RATIO 8.0. Harold L. Crane and James J. Adams. June 13, 1951. 54p. diagrs., photo. (NACA RM L51D24a)

THE EFFECTS OF CAMBER AND LEADING-EDGE-FLAP DEFLECTION ON THE PRESSURE PULSATIONS ON THIN RIGID AIRFOILS AT TRANSONIC SPEEDS. Milton D. Humphreys and John D. Kent. October 1952. 26p. diagrs., photos., tab. (NACA RM L52G22)

TRANSONIC AERODYNAMIC CHARACTERISTICS OF AN NACA 64A006 AIRFOIL SECTION WITH A 15-PERCENT-CHORD LEADING-EDGE FLAP. Milton D. Humphreys. September 1953. 44p. diagrs., photos. (NACA RM L53G23)

STUDY OF THE SUBSONIC FORCES AND MOMENTS ON AN INCLINED PLATE OF INFINITE SPAN. Bradford H. Wick. June 1954. 25p. diagrs. (NACA TN 3221)

HOVERING PERFORMANCE OF A HELICOPTER ROTOR USING NACA 8-H-12 AIRFOIL SECTIONS. Robert D. Powell, Jr. August 1954. 14p. diagrs., photos. (NACA TN 3237)

SECTION CHARACTERISTICS OF AN NACA 0006 AIRFOIL WITH AREA SUCTION NEAR THE LEADING EDGE. James A. Weiberg and Robert E. Dannenberg. September 1954. 47p. diagrs., photos., 3 tabs. (NACA TN 3285)

AERODYNAMIC CHARACTERISTICS OF NACA 0012 AIRFOIL SECTION AT ANGLES OF ATTACK FROM 0° TO 180°. Chris C. Critzos, Harry H. Heyson and Robert W. Boswinkle, Jr. January 1955. 21p. diagrs. (NACA TN 3361)

HYDRODYNAMIC TARES AND INTERFERENCE EFFECTS FOR A 12-PERCENT-THICK SURFACE-PIERCING STRUT AND AN ASPECT-RATIO-0.25 LIFTING SURFACE. John A. Ramsen and Victor L. Vaughan, Jr. April 1955. 20p. diagrs. (NACA TN 3420)

## HIGH-LIFT DEVICES (1.2.1.4)

LANDING CHARACTERISTICS OF HIGH-SPEED WINGS. Herbert A. Wilson, Jr. and Laurence K. Loftin, Jr. September 21, 1948. 21p. diagrs. (NACA RM L8A28e)

PRELIMINARY INVESTIGATION OF THE DELAY OF TURBULENT FLOW SEPARATION BY MEANS OF WEDGE-SHAPED BODIES. George B. McCullough, Gerald E. Nitzberg and John A. Kelly. March 1, 1951. 28p. diagrs., photos. (NACA RM A50L12)

PRESSURE DISTRIBUTION AND AERODYNAMIC COEFFICIENTS ASSOCIATED WITH HEAT ADDITION TO SUPERSONIC AIR STREAM ADJACENT TO TWO-DIMENSIONAL SUPERSONIC WING. I. Irving Pinkel, John S. Serafini and John L. Gregg. February 1952. 33p. diagrs., tab. (NACA RM E51K26)

EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF VORTEX GENERATORS ON THE MAXIMUM LIFT OF A 6-PERCENT-THICK SYMMETRICAL CIRCULAR-ARC AIRFOIL SECTION. William J. Burnsnall. October 1952. 16p. diagrs., 2 tabs. (NACA RM L52G24)

TRANSONIC AERODYNAMIC CHARACTERISTICS OF AN NACA 64A006 AIRFOIL SECTION WITH A 15-PERCENT-CHORD LEADING-EDGE FLAP. Milton D. Humphreys. September 1953. 44p. diagrs., photos. (NACA RM L53G23)

AERODYNAMIC LOADS ON A LEADING-EDGE FLAP AND A LEADING-EDGE SLAT ON THE NACA 64A010 AIRFOIL SECTION. John A. Kelly and George B. McCullough. June 1954. 33p. diagrs., 8 tabs. (NACA TN 3220)

SECTION CHARACTERISTICS OF AN NACA 0006 AIRFOIL WITH AREA SUCTION NEAR THE LEADING EDGE. James A. Weiberg and Robert E. Dannenberg. September 1954. 47p. diagrs., photos., 3 tabs. (NACA TN 3285)

## Plain Flaps (1.2.1.4.1)

AERODYNAMIC FORCES AND LOADINGS ON SYMMETRICAL CIRCULAR-ARC AIRFOILS WITH PLAIN LEADING-EDGE AND PLAIN TRAILING-EDGE FLAPS. Jones F. Cahill, William J. Underwood, Robert J. Nuber and Gail A. Cheesman. 1953. ii, 38p. diagrs., photos., 5 tabs. (NACA Rept. 1146. Formerly RM L6K22; RM L7H04; RM L50H17a)

INFLUENCE OF AIRFOIL TRAILING-EDGE ANGLE AND TRAILING-EDGE-THICKNESS VARIATION ON THE EFFECTIVENESS OF A PLAIN FLAP AT HIGH SUBSONIC MACH NUMBERS. Albert D. Hemenover and Donald J. Graham. June 1954. 101p. diagrs., photos., 5 tabs. (NACA TN 3174. Formerly RM A51C12a)



## AERODYNAMICS

### 18 WINGS (1. 2)

#### Plain Flaps - Wing Sections (Cont.)

LIFT ON A BENT, FLAT PLATE. (Auftrieb einer geknickten ebenen Platte). F. Keune. February 1955. 15p. diagsr. (NACA TM 1340. Trans. from Bericht der Aerodynamischer Versuchsanstalt Göttingen. Luftfahrtforschung, Mar. 20, 1936, Annual Volume, p. 85-87)

EXPLORATORY INVESTIGATION OF AN AIRFOIL WITH AREA SUCTION APPLIED TO A POROUS, ROUND TRAILING EDGE FITTED WITH A LIFT-CONTROL VANE. Robert E. Dannenberg and James A. Weiberg. April 1955. 55p. diagsr., photos., 2 tabs. (NACA TN 3498)

#### Split Flaps

(1. 2. 1. 4. 2)

SECTION CHARACTERISTICS OF AN NACA 0006 AIRFOIL WITH AREA SUCTION NEAR THE LEADING EDGE. James A. Weiberg and Robert E. Dannenberg. September 1954. 47p. diagsr., photos., 3 tabs. (NACA TN 3285)

#### Leading-Edge Flaps

(1. 2. 1. 4. 4)

THE EFFECTS OF CAMBER AND LEADING-EDGE-FLAP DEFLECTION ON THE PRESSURE PULSATIONS ON THIN RIGID AIRFOILS AT TRANSONIC SPEEDS. Milton D. Humphreys and John D. Kent. October 1952. 26p. diagsr., photos., tab. (NACA RM L52G22)

AERODYNAMIC FORCES AND LOADINGS ON SYMMETRICAL CIRCULAR-ARC AIRFOILS WITH PLAIN LEADING-EDGE AND PLAIN TRAILING-EDGE FLAPS. Jones F. Cahill, William J. Underwood, Robert J. Nuber and Gail A. Cheesman. 1953. ii, 38p. diagsr., photos., 5 tabs. (NACA Rept. 1146. Formerly RM L6K22; RM L7H04; RM L50H17a)

TRANSONIC AERODYNAMIC CHARACTERISTICS OF AN NACA 64A006 AIRFOIL SECTION WITH A 15-PERCENT-CHORD LEADING-EDGE FLAP. Milton D. Humphreys. September 1953. 44p. diagsr., photos. (NACA RM L53G23)

## CONTROLS

(1. 2. 1. 5)

#### Flap Type

(1. 2. 1. 5. 1)

PRELIMINARY INVESTIGATION OF VARIOUS AILERONS ON A 42° SWEEPBACK WING FOR LATERAL CONTROL AT TRANSONIC SPEEDS. Thomas R. Turner, Vernard E. Lockwood and Raymond D. Vogler. September 7, 1948. 35p. diagsr., photo. (NACA RM L8D21)

INVESTIGATION AT SUPERSONIC SPEEDS OF SOME OF THE FACTORS AFFECTING THE FLOW OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 2, 1951. 111p. diagsr., photos. (NACA RM L50J18)

INFLUENCE OF AIRFOIL TRAILING-EDGE ANGLE AND TRAILING-EDGE-THICKNESS VARIATION ON THE EFFECTIVENESS OF A PLAIN FLAP AT HIGH SUBSONIC MACH NUMBERS. Albert D. Hemenover and Donald J. Graham. June 1954. 101p. diagsr., photos., 5 tabs. (NACA TN 3174. Formerly RM A51C12a)

EXPLORATORY INVESTIGATION OF AN AIRFOIL WITH AREA SUCTION APPLIED TO A POROUS, ROUND TRAILING EDGE FITTED WITH A LIFT-CONTROL VANE. Robert E. Dannenberg and James A. Weiberg. April 1955. 55p. diagsr., photos., 2 tabs. (NACA TN 3498)

#### Spoilers

(1. 2. 1. 5. 2)

PRELIMINARY INVESTIGATION OF VARIOUS AILERONS ON A 42° SWEEPBACK WING FOR LATERAL CONTROL AT TRANSONIC SPEEDS. Thomas R. Turner, Vernard E. Lockwood and Raymond D. Vogler. September 7, 1948. 35p. diagsr., photo. (NACA RM L8D21)

## BOUNDARY LAYER

(1. 2. 1. 6)

INVESTIGATION AT MACH NUMBER 1.62 OF THE PRESSURE DISTRIBUTION OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 25, 1950. 81p. diagsr., photos. (NACA RM L9J05)

PRESSURE MEASUREMENTS AT SUPERSONIC SPEEDS ON A SECTION OF A RECTANGULAR WING HAVING AN NACA 65-009 PROFILE. Robert W. Rainey. March 10, 1950. 31p. diagsr., photos., tab. (NACA RM L9L16)

A PRELIMINARY FLIGHT INVESTIGATION OF THE EFFECTS OF VORTEX GENERATORS ON SEPARATION DUE TO SHOCK. Lindsay J. Lina and Wilmer H. Reed, III. November 30, 1950. 30p. diagsr., photos., tab. (NACA RM L50J02)

EXPERIMENTAL INVESTIGATION OF THE EFFECTS OF VORTEX GENERATORS ON THE MAXIMUM LIFT OF A 6-PERCENT-THICK SYMMETRICAL CIRCULAR-ARC AIRFOIL SECTION. William J. Burnsnall. October 1952. 16p. diagsr., 2 tabs. (NACA RM L52G24)

STUDY OF THE MOMENTUM DISTRIBUTION OF TURBULENT BOUNDARY LAYERS IN ADVERSE PRESSURE GRADIENTS. Virgil A. Sandborn and Raymond J. Slogar. January 1955. 79p. diagsr., photos. (NACA TN 3264)

EXPERIMENTS ON TURBULENT FLOW THROUGH CHANNELS HAVING POROUS ROUGH SURFACES WITH OR WITHOUT AIR INJECTION. E. R. G. Eckert, Anthony J. Diaguila and Patrick L. Donoughe. February 1955. 45p. diagsr., photos., tab. (NACA TN 3339)

#### Characteristics

(1. 2. 1. 6. 1)

PRELIMINARY INVESTIGATION OF THE TRANSONIC CHARACTERISTICS OF AN NACA SUBMERGED INLET. John A. Axelson and Robert A. Taylor. June 5, 1950. 44p. diagsr., photos. (NACA RM A50C13)

INVESTIGATION AT SUPERSONIC SPEEDS OF SOME OF THE FACTORS AFFECTING THE FLOW OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 2, 1951. 111p. diagsr., photos. (NACA RM L50J18)



## Characteristics - Wing Sections (Cont.)

PRELIMINARY INVESTIGATION OF THE DELAY OF TURBULENT FLOW SEPARATION BY MEANS OF WEDGE-SHAPED BODIES. George B. McCullough, Gerald E. Nitzberg and John A. Kelly. March 1, 1951. 28p. diagrs., photos. (NACA RM A50L12)

SECTION CHARACTERISTICS OF AN NACA 0006 AIRFOIL WITH AREA SUCTION NEAR THE LEADING EDGE. James A. Weiberg and Robert E. Dannenberg. September 1954. 47p. diagrs., photos., 3 tabs. (NACA TN 3285)

## Control

### (1.2.1.6.2)

INVESTIGATION OF A SIMPLE DEVICE FOR PREVENTING SEPARATION DUE TO SHOCK AND BOUNDARY-LAYER INTERACTION. Coleman duP. Donaldson. November 29, 1950. 34p. diagrs., photos. (NACA RM L50B02a)

THE USE OF SUCTION TO PREVENT SHOCK-INDUCED SEPARATION IN A NOZZLE. James R. Sterrett, Robert W. Dunning and Maurice J. Brevoort. January 30, 1951. 64p. diagrs., photos., 2 tabs. (NACA RM L50K20)

PRELIMINARY INVESTIGATION OF THE DELAY OF TURBULENT FLOW SEPARATION BY MEANS OF WEDGE-SHAPED BODIES. George B. McCullough, Gerald E. Nitzberg and John A. Kelly. March 1, 1951. 28p. diagrs., photos. (NACA RM A50L12)

SECTION CHARACTERISTICS OF AN NACA 0006 AIRFOIL WITH AREA SUCTION NEAR THE LEADING EDGE. James A. Weiberg and Robert E. Dannenberg. September 1954. 47p. diagrs., photos., 3 tabs. (NACA TN 3285)

A FIBROUS-GLASS COMPACT AS A PERMEABLE MATERIAL FOR BOUNDARY-LAYER-CONTROL APPLICATIONS USING AREA SUCTION. Robert E. Dannenberg, James A. Weiberg and Bruno J. Gambucci. January 1955. 20p. diagrs., photos., 2 tabs. (NACA TN 3388)

EXPLORATORY INVESTIGATION OF AN AIRFOIL WITH AREA SUCTION APPLIED TO A POROUS, ROUND TRAILING EDGE FITTED WITH A LIFT-CONTROL VANE. Robert E. Dannenberg and James A. Weiberg. April 1955. 55p. diagrs., photos., 2 tabs. (NACA TN 3498)

EFFECT OF A DISCONTINUITY ON TURBULENT BOUNDARY-LAYER-THICKNESS PARAMETERS WITH APPLICATION TO SHOCK-INDUCED SEPARATION. Eli Reshotko and Maurice Tucker. May 1955. 21p. diagrs. (NACA TN 3454)

## REYNOLDS NUMBER EFFECTS (1.2.1.7)

INVESTIGATION AT MACH NUMBER 1.62 OF THE PRESSURE DISTRIBUTION OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 25, 1950. 81p. diagrs., photos. (NACA RM L9J05)

EXPLORATORY INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF TWO EXPERIMENTAL 6-PERCENT-THICK AIRFOIL SECTIONS DESIGNED TO HAVE HIGH MAXIMUM LIFT COEFFICIENTS. Laurence K. Loftin, Jr. and Albert E. von Doenhoff. December 1951. 48p. diagrs., photo., 2 tabs. (NACA RM L51F06)

INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF TWO SYMMETRICAL 6-PERCENT-THICK AIRFOIL SECTIONS DESIGNED TO HAVE HIGH MAXIMUM LIFT COEFFICIENTS AT LOW SPEEDS. Nicholas J. Paradiso. October 1952. 37p. diagrs., photo., 2 tabs. (NACA RM L52I02)

AERODYNAMIC FORCES AND LOADINGS ON SYMMETRICAL CIRCULAR-ARC AIRFOILS WITH PLAIN LEADING-EDGE AND PLAIN TRAILING-EDGE FLAPS. Jones F. Cahill, William J. Underwood, Robert J. Nuber and Gail A. Cheesman. 1953. ii, 38p. diagrs., photos., 5 tabs. (NACA Rept. 1146. Formerly RM L6K22; RM L7H04; RM L50H17a)

STUDY OF THE SUBSONIC FORCES AND MOMENTS ON AN INCLINED PLATE OF INFINITE SPAN. Bradford H. Wick. June 1954. 25p. diagrs. (NACA TN 3221)

AIRFOIL SECTION CHARACTERISTICS AT HIGH ANGLES OF ATTACK. Laurence K. Loftin, Jr. August 1954. 10p. diagrs. (NACA TN 3241)

AERODYNAMIC CHARACTERISTICS OF THE NACA 64-010 AND 0010-1.10 40/1.051 AIRFOIL SECTIONS AT MACH NUMBERS FROM 0.30 TO 0.85 AND REYNOLDS NUMBERS FROM  $4.0 \times 10^6$  TO  $8.0 \times 10^6$ . Laurence K. Loftin, Jr. August 1954. 17p. diagrs., tab. (NACA TN 3244)

AERODYNAMIC CHARACTERISTICS OF NACA 0012 AIRFOIL SECTION AT ANGLES OF ATTACK FROM  $0^\circ$  TO  $180^\circ$ . Chris C. Critzovs, Harry H. Heyson and Robert W. Boswinkle, Jr. January 1955. 21p. diagrs. (NACA TN 3361)

HYDRODYNAMIC TARES AND INTERFERENCE EFFECTS FOR A 12-PERCENT-THICK SURFACE-PIERCING STRUT AND AN ASPECT-RATIO-0.25 LIFTING SURFACE. John A. Ramsen and Victor L. Vaughan, Jr. April 1955. 20p. diagrs. (NACA TN 3420)

THE SUBSONIC AERODYNAMIC CHARACTERISTICS OF TWO DOUBLE-WEDGE AIRFOIL SECTIONS SUITABLE FOR SUPERSONIC FLIGHT. Joseph Solomon and Floyd W. Henney. May 12, 1947. 33p. diagrs., photos. (NACA RM A6G24)

## MACH NUMBER EFFECTS (1.2.1.8)

APPLICATION OF ONE PART OF VON KARMAN'S TWO-DIMENSIONAL TRANSONIC SIMILARITY LAW TO DRAG DATA OF NACA 65-SERIES WINGS. Kenneth B. Amer. August 24, 1948. 9p. diagrs. (NACA RM L8F24)

PRELIMINARY INVESTIGATION OF VARIOUS AILERONS ON A  $42^\circ$  SWEEPBACK WING FOR LATERAL CONTROL AT TRANSONIC SPEEDS. Thomas R. Turner, Vernard E. Lockwood and Raymond D. Vogler. September 7, 1948. 35p. diagrs., photo. (NACA RM L8D21)

EXPERIMENTAL PRESSURE DISTRIBUTIONS OVER WING TIPS AT MACH NUMBER 1.9. I - WING TIP WITH SUBSONIC LEADING EDGE. James M. Jagger and Harold Mirels. January 27, 1949. 28p. diagrs., photo. (NACA RM E8K26)



## AERODYNAMICS

### 20 WINGS (1. 2)

#### Mach Number Effect - Wing Sections (Cont.)

PRESSURE-DISTRIBUTION DATA FOR THE NACA 64<sub>1</sub>-012 AND 64<sub>1</sub>A012 AIRFOILS AT HIGH SUBSONIC MACH NUMBERS. Milton D. Humphreys. May 6, 1949. 37p. photos., diagrs., 8 tabs. (NACA RM L9C18)

EXPERIMENTAL PRESSURE DISTRIBUTIONS OVER WING TIPS AT MACH NUMBER 1.9. II - WING TIP WITH SUBSONIC TRAILING EDGE. Harold Mirels and James M. Jagger. December 21, 1949. 23p. diagrs., photo. (NACA RM E9I22a)

PRESSURE MEASUREMENTS AT SUPERSONIC SPEEDS ON A SECTION OF A RECTANGULAR WING HAVING AN NACA 65-009 PROFILE. Robert W. Rainey. March 10, 1950. 31p. diagrs., photos., tab. (NACA RM L9L16)

INVESTIGATION OF A SIMPLE DEVICE FOR PREVENTING SEPARATION DUE TO SHOCK AND BOUNDARY-LAYER INTERACTION. Coleman duP. Donaldson. November 29, 1950. 34p. diagrs., photos. (NACA RM L50B02a)

A PRELIMINARY FLIGHT INVESTIGATION OF THE EFFECTS OF VORTEX GENERATORS ON SEPARATION DUE TO SHOCK. Lindsay J. Lina and Wilmer H. Reed, III. November 30, 1950. 30p. diagrs., photos., tab. (NACA RM L50J02)

LIFT AND MOMENT CHARACTERISTICS AT SUBSONIC MACH NUMBERS OF FOUR 10-PERCENT-THICK AIRFOIL SECTIONS OF VARYING TRAILING-EDGE THICKNESS. James L. Summers and William A. Page. December 20, 1950. 32p. diagrs., photos. (NACA RM A50J09)

INVESTIGATION AT SUPERSONIC SPEEDS OF SOME OF THE FACTORS AFFECTING THE FLOW OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 2, 1951. 111p. diagrs., photos. (NACA RM L50J18)

THE USE OF SUCTION TO PREVENT SHOCK-INDUCED SEPARATION IN A NOZZLE. James R. Sterrett, Robert W. Dunning and Maurice J. Brevoort. January 30, 1951. 64p. diagrs., photos., 2 tabs. (NACA RM L50K20)

WING-FLOW INVESTIGATION OF THE CHARACTERISTICS OF SEVEN UNSWEPT, UNTAPERED AIRFOILS OF ASPECT RATIO 8.0. Harold L. Crane and James J. Adams. June 13, 1951. 54p. diagrs., photo. (NACA RM L51D24a)

MEASUREMENTS IN FLIGHT OF THE LONGITUDINAL CHARACTERISTICS OF TWO JET AIRCRAFT, ONE WITH A DIVING TENDENCY AND THE OTHER WITH A CLIMBING TENDENCY AT HIGH MACH NUMBERS. Seth B. Anderson. October 1951. 18p. diagrs., photos., 2 tabs. (NACA RM A51E14)

EXPLORATORY INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF TWO EXPERIMENTAL 6-PERCENT-THICK AIRFOIL SECTIONS DESIGNED TO HAVE HIGH MAXIMUM LIFT COEFFICIENTS. Laurence K. Loftin, Jr. and Albert E. von Doenhoff. December 1951. 48p. diagrs., photo., 2 tabs. (NACA RM L51F06)

THE EFFECTS OF CAMBER AND LEADING-EDGE-FLAP DEFLECTION ON THE PRESSURE PULSATIONS ON THIN RIGID AIRFOILS AT TRANSONIC SPEEDS. Milton D. Humphreys and John D. Kent. October 1952. 26p. diagrs., photos., tab. (NACA RM L52G22)

EFFECT OF THICKNESS, CAMBER, AND THICKNESS DISTRIBUTION ON AIRFOIL CHARACTERISTICS AT MACH NUMBERS UP TO 1.0. Bernard N. Daley and Richard S. Dick. October 1952. 76p. photos., diagrs., tab. (NACA RM L52G31a)

INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF TWO SYMMETRICAL 6-PERCENT-THICK AIRFOIL SECTIONS DESIGNED TO HAVE HIGH MAXIMUM LIFT COEFFICIENTS AT LOW SPEEDS. Nicholas J. Paradiso. October 1952. 37p. diagrs., photo., 2 tabs. (NACA RM L52I02)

MEASUREMENTS OF FLUCTUATING PRESSURES ON A 1/4-SCALE MODEL OF THE X-1 AIRPLANE WITH A 10-PERCENT-THICK WING IN THE LANGLEY 16-FOOT TRANSONIC TUNNEL. Louis W. Habel and Seymour Steinberg. January 1953. 29p. diagrs., photos. (NACA RM L52J31)

TRANSONIC AERODYNAMIC CHARACTERISTICS OF AN NACA 64A006 AIRFOIL SECTION WITH A 15-PERCENT-CHORD LEADING-EDGE FLAP. Milton D. Humphreys. September 1953. 44p. diagrs., photos. (NACA RM L53G23)

THEORETICAL STUDY OF THE TRANSONIC LIFT OF A DOUBLE-WEDGE PROFILE WITH DETACHED BOW WAVE. Walter G. Vincenti and Cleo B. Wagoner. (Portions of this work were reported at the eighth International Congress on Theoretical and Applied Mechanics, Istanbul, Turkey, August 20-28, 1952). 1954. ii, 24p. diagrs., 2 tabs. (NACA Rept. 1180. Formerly TN 2832)

AN EXPERIMENTAL STUDY OF THE LIFT AND PRESSURE DISTRIBUTION ON A DOUBLE-WEDGE PROFILE AT MACH NUMBERS NEAR SHOCK ATTACHMENT. Walter G. Vincenti, Duane W. Dugan and E. Ray Phelps. July 1954. 43p. diagrs. (NACA TN 3225)

AIRFOIL SECTION CHARACTERISTICS AT HIGH ANGLES OF ATTACK. Laurence K. Loftin, Jr. August 1954. 10p. diagrs. (NACA TN 3241)

AERODYNAMIC CHARACTERISTICS OF THE NACA 64-010 AND 0010-1.10 40/1.051 AIRFOIL SECTIONS AT MACH NUMBERS FROM 0.30 TO 0.85 AND REYNOLDS NUMBERS FROM  $4.0 \times 10^6$  TO  $8.0 \times 10^6$ . Laurence K. Loftin, Jr. August 1954. 17p. diagrs., tab. (NACA TN 3244)

AN INVESTIGATION OF A LIFTING 10-PERCENT-THICK SYMMETRICAL DOUBLE-WEDGE AIRFOIL AT MACH NUMBERS UP TO 1. Milton D. Humphreys. November 1954. 35p. diagrs., photos., tab. (NACA TN 3306)

SECOND-ORDER SUBSONIC AIRFOIL-SECTION THEORY AND ITS PRACTICAL APPLICATION. Milton D. Van Dyke. March 1955. 50p. diagrs., 5 tabs. (NACA TN 3390)

AERODYNAMIC CHARACTERISTICS OF SEVERAL 6-PERCENT-THICK AIRFOILS AT ANGLES OF ATTACK FROM  $0^\circ$  TO  $20^\circ$  AT HIGH SUBSONIC SPEEDS. Bernard N. Daley and Douglas R. Lord. May 1955. 57p. diagrs., photos. (NACA TN 3424. Formerly RM L9E19)



WAKE  
(1.2.1.9)

AERODYNAMIC INVESTIGATION AT MACH NUMBER 1.92 OF A RECTANGULAR WING AND TAIL AND BODY CONFIGURATION AND ITS COMPONENTS. Macon C. Ellis, Jr. and Carl E. Grigsby. March 1, 1950. 96p. diagrs., photos., 4 tabs. (NACA RM L9L28a)

INVESTIGATION OF A SIMPLE DEVICE FOR PREVENTING SEPARATION DUE TO SHOCK AND BOUNDARY-LAYER INTERACTION. Coleman duP. Donaldson. November 29, 1950. 34p. diagrs., photos. (NACA RM L50B02a)

LIFT AND MOMENT CHARACTERISTICS AT SUBSONIC MACH NUMBERS OF FOUR 10-PERCENT-THICK AIRFOIL SECTIONS OF VARYING TRAILING-EDGE THICKNESS. James L. Summers and William A. Page. December 20, 1950. 32p. diagrs., photos. (NACA RM A50J09)

PRELIMINARY INVESTIGATION OF THE PRESSURE FLUCTUATIONS IN THE WAKES OF TWO-DIMENSIONAL WINGS AT LOW ANGLES OF ATTACK. Robert M. Sorenson, John A. Wyss and James C. Kyle. October 1951. 58p. diagrs., photos. (NACA RM A51G10)

CORRELATION OF BUFFET BOUNDARIES PREDICTED FROM WIND-TUNNEL TESTS WITH THOSE MEASURED DURING FLIGHT TESTS ON THE F8F-1 AND X-1 AIRPLANES - TRANSONIC-BUMP METHOD. Andrew Martin and James F. Reed. December 1952. 22p. diagrs., photos., tab. (NACA RM A52J17)

STUDY OF THE SUBSONIC FORCES AND MOMENTS ON AN INCLINED PLATE OF INFINITE SPAN. Bradford H. Wick. June 1954. 25p. diagrs. (NACA TN 3221)

COMPLETE WINGS  
(1.2.2)

WIND-TUNNEL INVESTIGATION AT A MACH NUMBER OF 1.53 OF AN AIRPLANE WITH A TRIANGULAR WING. Richard Scherrer and William R. Wimbrow. January 23, 1948. 74p. diagrs., photos., 2 tabs. (NACA RM A7J05)

FLIGHT TESTS AT SUPERSONIC SPEEDS TO DETERMINE THE EFFECT OF TAPER ON THE ZERO-LIFT DRAG OF SWEPTBACK LOW-ASPECT-RATIO WINGS. Murray Pittel. September 5, 1950. 23p. diagrs., photos. (NACA RM L50F30a)

AN EXPERIMENTAL STUDY OF MODERATE AND HIGH SUBSONIC SPEEDS OF THE FLOW OVER AN UNSWEPT WING IN CONJUNCTION WITH A FUSELAGE. Richard T. Whitcomb. June 18, 1951. 35p. diagrs., photos. (NACA RM L50L07)

THE EFFECTS AT TRANSONIC SPEEDS OF THICKENING THE TRAILING EDGE OF A WING WITH A 4-PERCENT-THICK CIRCULAR-ARC AIRFOIL. Joseph W. Cleary and George L. Stevens. December 1951. 43p. diagrs., photo. (NACA RM A51J11)

FORCE TESTS OF THREE THIN WINGS OF MODERATELY LOW ASPECT RATIO AT HIGH SUBSONIC MACH NUMBERS. Gareth H. Jordan. October 1952. 22p. diagrs. (NACA RM L52I08)

WING THEORY  
(1.2.2.1)

A TORSIONAL STIFFNESS CRITERION FOR PREVENTING FLUTTER OF WINGS OF SUPERSONIC MISSILES. Bernard Budiansky, Joseph N. Kotanchik and Patrick T. Chiarito. August 28, 1947. 14p. diagrs., tab. (NACA RM L7G02)

INVESTIGATION AT SUPERSONIC SPEED ( $M = 1.53$ ) OF THE PRESSURE DISTRIBUTION OVER A  $63^\circ$  SWEPT AIRFOIL OF BICONVEX SECTION AT ZERO LIFT. Charles W. Frick and John W. Boyd. June 10, 1948. 33p. diagrs., photos. (NACA RM A8C22)

INVESTIGATION AT SUPERSONIC SPEED ( $M = 1.53$ ) OF THE PRESSURE DISTRIBUTION OVER A  $63^\circ$  SWEPT AIRFOIL OF BICONVEX SECTION AT SEVERAL ANGLES OF ATTACK. John W. Boyd, Elliott D. Katzen and Charles W. Frick. September 24, 1948. 41p. diagrs., photos., tab. (NACA RM A8F22)

ESTIMATION OF LIFT AND DRAG OF AIRFOILS AT NEAR SONIC SPEEDS AND IN THE PRESENCE OF DETACHED SHOCK WAVES. John P. Mayer. February 23, 1949. 23p. diagrs. (NACA RM L8L07)

FLIGHT TESTS AT SUPERSONIC SPEEDS TO DETERMINE THE EFFECT OF TAPER ON THE ZERO-LIFT DRAG OF SWEPTBACK LOW-ASPECT-RATIO WINGS. Murray Pittel. September 5, 1950. 23p. diagrs., photos. (NACA RM L50F30a)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.38 OF FOUR WINGS OF ASPECT RATIO 4 HAVING QUARTER-CHORD SWEEP ANGLES OF  $0^\circ$ ,  $35^\circ$ ,  $45^\circ$ , AND  $60^\circ$ . William B. Kemp, Jr., Kenneth W. Goodson and Robert A. Booth. October 10, 1950. 41p. diagrs., photos., tab. (NACA RM L50G14)

A METHOD FOR THE DESIGN OF SWEPTBACK WINGS WARPED TO PRODUCE SPECIFIED FLIGHT CHARACTERISTICS AT SUPERSONIC SPEEDS. Warren A. Tucker. September 1951. 52p. diagrs., 2 tabs. (NACA RM L51F08)

A CORRELATION OF EXPERIMENTAL ZERO-LIFT DRAG OF RECTANGULAR WINGS WITH SYMMETRICAL NACA 65-SERIES AIRFOIL SECTIONS BY MEANS OF THE TRANSONIC SIMILARITY LAW FOR WINGS OF FINITE ASPECT RATIO. Edward C. B. Danforth. September 1951. 20p. diagrs. (NACA RM L51G20)

A CORRELATION BY MEANS OF THE TRANSONIC SIMILARITY RULES OF THE EXPERIMENTALLY DETERMINED CHARACTERISTICS OF 22 RECTANGULAR WINGS OF SYMMETRICAL PROFILE. John B. McDevitt. February 1952. 60p. diagrs., 3 tabs. (NACA RM A51L17b)

AN ANALYSIS OF ESTIMATED AND EXPERIMENTAL TRANSONIC DOWNWASH CHARACTERISTICS AS AFFECTED BY PLAN FORM AND THICKNESS FOR WING AND WING-FUSELAGE CONFIGURATIONS. Joseph Weil, George S. Campbell and Margaret S. Diederich. November 1952. 92p. diagrs., 2 tabs. (NACA RM L52I22)

A VECTOR STUDY OF LINEARIZED SUPERSONIC FLOW APPLICATIONS TO NONPLANAR PROBLEMS. John C. Martin. 1953. ii, 34p. diagrs., tab. (NACA Rept. 1143. Formerly TN 2641)

ON THE APPLICATION OF TRANSONIC SIMILARITY RULES TO WINGS OF FINITE SPAN. John R. Spreiter. 1953. ii, 21p. diagrs. (NACA Rept. 1153. Formerly TN 2726)



## Theory - Complete Wings (Cont.)

A CORRELATION BY MEANS OF TRANSONIC SIMILARITY RULES OF THE EXPERIMENTALLY DETERMINED CHARACTERISTICS OF 18 CAMBERED WINGS OF RECTANGULAR PLAN FORM. John B. McDevitt. September 1953. 57p. diagsr. (NACA RM A53G31)

METHOD FOR CALCULATING THE ROLLING AND YAWING MOMENTS DUE TO ROLLING FOR UNSWEPT WINGS WITH OR WITHOUT FLAPS OR AILERONS BY USE OF NONLINEAR SECTION LIFT DATA. Albert P. Martina. 1954. ii, 16p. diagsr., 11 tabs. (NACA Rept. 1167. Formerly TN 2937)

THE CALCULATION OF PRESSURE ON SLENDER AIRPLANES IN SUBSONIC AND SUPERSONIC FLOW. Max. A. Heaslet and Harvard Lomax. 1954. ii, 11p. diagsr. (NACA Rept. 1185. Formerly TN 2900)

TABLES FOR THE COMPUTATION OF WAVE DRAG OF ARROW WINGS OF ARBITRARY AIRFOIL SECTION. Frederick C. Grant and Morton Cooper. June 1954. 9p. diagr., 28p. tabs. (in pocket) (NACA TN 3185)

LIFT AND PITCHING MOMENT AT SUPERSONIC SPEEDS DUE TO CONSTANT VERTICAL ACCELERATION FOR THIN SWEPTBACK TAPERED WINGS WITH STREAMWISE TIPS. SUPERSONIC LEADING AND TRAILING EDGES. Isabella J. Cole and Kenneth Margolis. July 1954. 67p. diagsr., 4 tabs. (NACA TN 3196)

THEORETICAL INVESTIGATION OF THE EFFECTS UPON LIFT OF A GAP BETWEEN WING AND BODY OF A SLENDER WING-BODY COMBINATION. Duane W. Dugan and Katsumi Hikido. August 1954. 41p. diagsr. (NACA TN 3224)

ON THE DETERMINATION OF CERTAIN BASIC TYPES OF SUPERSONIC FLOW FIELDS. (Sulla determinazione di alcuni tipi di campi di corrente ipersonora). Carlo Ferrari. November 1954. 17p. diagsr. (NACA TM 1381. Trans. from Rendiconti della R. Accademie Nazionale dei Lincei, Series 8, v. 7, no. 6, Dec. 1949)

AERODYNAMIC FORCES, MOMENTS, AND STABILITY DERIVATIVES FOR SLENDER BODIES OF GENERAL CROSS SECTION. Alvin H. Sacks. November 1954. (i), 74p. diagsr., 2 tabs. (NACA TN 3283)

GENERALIZED INDICIAL FORCES ON DEFORMING RECTANGULAR WINGS IN SUPERSONIC FLIGHT. Harvard Lomax, Franklyn B. Fuller and Loma Sluder. November 1954. 74p. diagsr., tab. (NACA TN 3286)

SUBSONIC EDGES IN THIN-WING AND SLENDER-BODY THEORY. Milton D. Van Dyke. November 1954. 26p. diagsr. (NACA TN 3343)

GENERAL THEORY OF CONICAL FLOWS AND ITS APPLICATION TO SUPERSONIC AERODYNAMICS. (La théorie générale des mouvements coniques et ses applications à l'aérodynamique supersonique). Paul Germain. PREFACE. M. J. Peres. January 1955. vii, 333p. diagsr. (NACA TM 1354. Trans. from Office National d'Études et de Recherches Aéronautiques, Pub. 34, 1949)

DESCRIPTION AND ANALYSIS OF A ROCKET-VEHICLE EXPERIMENT ON FLUTTER INVOLVING WING DEFORMATION AND BODY MOTIONS. H. J. Cunningham and R. R. Lundstrom. January 1955. 26p. diagsr., photos., 2 tabs. (NACA TN 3311. Formerly RM L50I29)

A NOTE ON THE DRAG DUE TO LIFT OF RECTANGULAR WINGS OF LOW ASPECT RATIO. Edward C. Polhamus. January 1955. 24p. diagsr. (NACA TN 3324)

ON SLENDER DELTA WINGS WITH LEADING-EDGE SEPARATION. Clinton E. Brown and William H. Michael, Jr. April 1955. 27p. diagsr. (NACA TN 3430)

THE ZERO-LIFT WAVE DRAG OF A PARTICULAR FAMILY OF UNSWEPT, TAPERED WINGS WITH LINEARLY VARYING THICKNESS RATIO. Arthur Henderson, Jr. and Julia M. Goodwin. May 1955. 28p. diagsr. (NACA TN 3418)

## WING VARIABLES (1.2.2.2)

INVESTIGATION AT SUPERSONIC SPEED ( $M = 1.53$ ) OF THE PRESSURE DISTRIBUTION OVER A  $63^\circ$  SWEPT AIRFOIL OF BICONVEX SECTION AT ZERO LIFT. Charles W. Frick and John W. Boyd. June 10, 1948. 33p. diagsr., photos. (NACA RM A8C22)

INVESTIGATION AT SUPERSONIC SPEED ( $M = 1.53$ ) OF THE PRESSURE DISTRIBUTION OVER A  $63^\circ$  SWEPT AIRFOIL OF BICONVEX SECTION AT SEVERAL ANGLES OF ATTACK. John W. Boyd, Elliott D. Katzen and Charles W. Frick. September 24, 1948. 41p. diagsr., photos., tab. (NACA RM A8F22)

AERODYNAMIC CHARACTERISTICS AT SUBSONIC AND SUPERSONIC MACH NUMBERS OF A THIN TRIANGULAR WING OF ASPECT RATIO 2. I - MAXIMUM THICKNESS AT 20 PERCENT OF THE CHORD. Robert E. Berggren and James L. Summers. November 19, 1948. 41p. diagsr., photos. (NACA RM A8I16)

AERODYNAMIC CHARACTERISTICS AT SUBSONIC AND SUPERSONIC MACH NUMBERS OF A THIN TRIANGULAR WING OF ASPECT RATIO 2. II - MAXIMUM THICKNESS AT MIDCHORD. Harold J. Walker and Robert E. Berggren. December 3, 1948. 41p. diagsr., photos. (NACA RM A8I20)

EFFECT OF WING SWEEP, TAPER, AND THICKNESS RATIO ON THE TRANSONIC DRAG CHARACTERISTICS OF WING-BODY COMBINATIONS. Jim Rogers Thompson and Charles W. Mathews. December 31, 1948. 29p. diagsr., photos., 2 tabs. (NACA RM L8K01)

INVESTIGATIONS AT SUPERSONIC SPEEDS OF 22 TRIANGULAR WINGS REPRESENTING TWO AIRFOIL SECTIONS FOR EACH OF 11 APEX ANGLES. Eugene S. Love. May 10, 1949. 100p. diagsr., photos., 3 tabs. (NACA RM L9D07)

A FREE-FLIGHT TECHNIQUE FOR MEASURING DAMPING IN ROLL BY USE OF ROCKET-POWERED MODELS AND SOME INITIAL RESULTS FOR RECTANGULAR WINGS. James L. Edmondson and E. Claude Sanders, Jr. December 20, 1949. 25p. diagsr., photos. (NACA RM L9I01)

THE DAMPING IN ROLL OF ROCKET-POWERED TEST VEHICLES HAVING RECTANGULAR WINGS WITH NACA 65-006 AND SYMMETRICAL DOUBLE-WEDGE AIRFOIL SECTIONS OF ASPECT RATIO 4.5. Albert E. Dietz and James L. Edmondson. March 29, 1950. 12p. diagsr. (NACA RM L50B10)

DAMPING IN ROLL OF RECTANGULAR WINGS OF SEVERAL ASPECT RATIOS AND NACA 65A-SERIES AIRFOIL SECTIONS OF SEVERAL THICKNESS RATIOS AT TRANSONIC AND SUPERSONIC SPEEDS AS DETERMINED WITH ROCKET-POWERED MODELS. James L. Edmondson. August 24, 1950. 16p. diagsr. (NACA RM L50E26)



## Variables - Complete Wings (Cont.)

TABULATED PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS MEASURED IN FLIGHT ON THE WING OF THE DOUGLAS D-558-I AIRPLANE FOR A 1 g STALL, A SPEED RUN TO A MACH NUMBER OF 0.90, AND A WIND-UP TURN AT A MACH NUMBER OF 0.86. Earl R. Keener and Mary Pierce. December 15, 1950. 40p. diagrs., photos., 5 tabs. (NACA RM L50J10)

TABULATED PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS MEASURED IN FLIGHT ON THE WING OF THE DOUGLAS D-558-I AIRPLANE THROUGHOUT THE NORMAL-FORCE-COEFFICIENT RANGE AT MACH NUMBERS OF 0.67, 0.74, 0.78, AND 0.82. Earl R. Keener, James R. Peele and Julia B. Woodbridge. January 29, 1951. 37p. diagrs., photos., 6 tabs. (NACA RM L50L12a)

THE EFFECT OF END PLATES, END STRUTS, AND DEPTH OF SUBMERGENCE ON THE CHARACTERISTICS OF A HYDROFOIL. Kenneth L. Wadlin, Rudolph E. Fontana and Charles L. Shuford, Jr. April 12, 1951. 84p. diagrs., photos. (NACA RM L51B13)

EFFECTS OF SPANWISE THICKNESS VARIATION ON THE AERODYNAMIC CHARACTERISTICS OF 35° AND 45° SWEEPBACK WINGS OF ASPECT RATIO 6. TRANSONIC-BUMP METHOD. William D. Morrison, Jr. and Paul G. Fournier. July 1951. 38p. diagrs., photo. (NACA RM L51D19)

TABULATED PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS MEASURED IN FLIGHT ON THE WING OF THE D-558-I RESEARCH AIRPLANE THROUGH A MACH NUMBER RANGE OF 0.80 TO 0.89 AND THROUGHOUT THE NORMAL-FORCE-COEFFICIENT RANGE AT MACH NUMBERS OF 0.61, 0.70, 0.855, AND 0.88. Earl R. Keener and Rozalia M. Bandish. August 1951. 43p. diagrs., photos., 7 tabs. (NACA RM L51F12)

A METHOD FOR THE DESIGN OF SWEEPBACK WINGS WARPED TO PRODUCE SPECIFIED FLIGHT CHARACTERISTICS AT SUPERSONIC SPEEDS. Warren A. Tucker. September 1951. 52p. diagrs., 2 tabs. (NACA RM L51F08)

EFFECTS OF SPANWISE THICKNESS VARIATION ON THE TRANSONIC AERODYNAMIC CHARACTERISTICS OF WINGS HAVING 35° OF SWEEPBACK, ASPECT RATIO 4, AND TAPER RATIO 0.60. William D. Morrison, Jr. and Paul G. Fournier. September 1951. 21p. diagrs., photo. (NACA RM L51F28)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A WING HAVING 45° SWEEP, ASPECT RATIO 8, TAPER RATIO 0.45, AND AIRFOIL SECTIONS VARYING FROM THE NACA 63A010 SECTION AT THE ROOT TO THE NACA 63A006 SECTION AT THE TIP. William D. Morrison, Jr. and Paul G. Fournier. January 1952. 22p. diagrs., photo. (NACA RM L51H28)

SMALL-SCALE INVESTIGATION OF THE EFFECTS OF TWIST AND CAMBER ON THE AERODYNAMIC CHARACTERISTICS OF A 60° 42' SWEEPBACK WING OF ASPECT RATIO 1.94. Kenneth P. Spreemann and William J. Alford, Jr. January 1952. 19p. diagrs., photo., tab. (NACA RM L51I21)

A CORRELATION BY MEANS OF THE TRANSONIC SIMILARITY RULES OF THE EXPERIMENTALLY DETERMINED CHARACTERISTICS OF 22 RECTANGULAR WINGS OF SYMMETRICAL PROFILE. John B. McDevitt. February 1952. 60p. diagrs., 3 tabs. (NACA RM A51L17b)

LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF 60° TRIANGULAR-WING AND MODIFIED 60° TRIANGULAR-WING MODELS HAVING HALF-DELTA AND HALF-DIAMOND TIP CONTROLS. Jacob H. Lichtenstein and Byron M. Jaquet. February 1952. 36p. diagrs., photos., tab. (NACA RM L51K08)

AN INVESTIGATION OF THE LOW-SPEED LONGITUDINAL STABILITY CHARACTERISTICS OF A SWEEP-WING AIRPLANE MODEL WITH TWO MODIFICATIONS TO THE WING-ROOT PLAN FORM. William B. Kemp, Jr. July 1952. 17p. diagrs., tab. (NACA RM L52E07)

AN ANALYSIS OF ESTIMATED AND EXPERIMENTAL TRANSONIC DOWNWASH CHARACTERISTICS AS AFFECTED BY PLAN FORM AND THICKNESS FOR WING AND WING-FUSELAGE CONFIGURATIONS. Joseph Weil, George S. Campbell and Margaret S. Diederich. November 1952. 92p. diagrs., 2 tabs. (NACA RM L52I22)

INVESTIGATION OF THREE TAPERED 45° SWEEPBACK CAMBERED AND TWISTED WINGS COVERING A SIMULTANEOUS VARIATION IN ASPECT RATIO AND THICKNESS RATIO AND OF ONE RELATED SYMMETRICAL WING AT TRANSONIC SPEEDS BY THE WING-FLOW METHOD. Harold I. Johnson. March 1953. 55p. diagrs., photos., 2 tabs. (NACA RM L52H07)

TABLES FOR THE COMPUTATION OF WAVE DRAG OF ARROW WINGS OF ARBITRARY AIRFOIL SECTION. Frederick C. Grant and Morton Cooper. June 1954. 9p. diagrs., 28p. tabs. (in pocket) (NACA TN 3185)

DESIGN CONSIDERATIONS FOR WINGS HAVING MINIMUM DRAG DUE TO LIFT. Warren A. Tucker. December 1954. 26p. diagrs. (NACA TN 3317)

GENERAL THEORY OF CONICAL FLOWS AND ITS APPLICATION TO SUPERSONIC AERODYNAMICS. (La théorie générale des mouvements coniques et ses applications à l'aérodynamique supersonique). Paul Germain. PREFACE. M. J. Peres. January 1955. vii, 333p. diagrs. (NACA TM 1354. Trans. from Office National d'Études et de Recherches Aéronautiques, Pub. 34, 1949)

## Profiles (1.2.2.2.1)

MEASUREMENTS OF THE EFFECTS OF THICKNESS RATIO AND ASPECT RATIO ON THE DRAG OF RECTANGULAR-PLAN-FORM AIRFOILS AT TRANSONIC SPEEDS. Jim Rogers Thompson and Charles W. Mathews. June 20, 1947. 17p. diagrs., photo. (NACA RM L7E08)

FLIGHT TESTS TO DETERMINE THE EFFECT OF AIRFOIL SECTION PROFILE AND THICKNESS RATIO ON THE ZERO-LIFT DRAG OF LOW-ASPECT-RATIO WINGS AT SUPERSONIC SPEEDS. Ellis Katz. February 9, 1948. 19p. diagrs., photos. (NACA RM L7K14)

INVESTIGATION AT SUPERSONIC SPEED ( $M = 1.53$ ) OF THE PRESSURE DISTRIBUTION OVER A 63° SWEEP AIRFOIL OF BICONVEX SECTION AT ZERO LIFT. Charles W. Frick and John W. Boyd. June 10, 1948. 33p. diagrs., photos. (NACA RM A8C22)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. D-558-1 SPEED-REDUCTION BRAKE AND SYMMETRICAL-PROFILE WING CHARACTERISTICS. John B. Wright. June 15, 1948. 22p. diagrs., tab. (NACA RM L8B06)



Profiles - Complete Wings (Cont.)

PRELIMINARY FREE-FLIGHT INVESTIGATION OF THE EFFECT OF AIRFOIL SECTION ON AILERON ROLLING EFFECTIVENESS AT TRANSONIC AND SUPERSONIC SPEEDS. Carl A. Sandahl. June 25, 1948. 6p. diags. (NACA RM L8B26)

LANDING CHARACTERISTICS OF HIGH-SPEED WINGS. Herbert A. Wilson, Jr. and Laurence K. Loftin, Jr. September 21, 1948. 21p. diags. (NACA RM L8A28e)

INVESTIGATION AT SUPERSONIC SPEED ( $M = 1.53$ ) OF THE PRESSURE DISTRIBUTION OVER A  $63^\circ$  SWEEPED AIRFOIL OF BICONVEX SECTION AT SEVERAL ANGLES OF ATTACK. John W. Boyd, Elliott D. Katzen and Charles W. Frick. September 24, 1948. 41p. diags., photos., tab. (NACA RM A8F22)

EFFECT OF WING SWEEP, TAPER, AND THICKNESS RATIO ON THE TRANSONIC DRAG CHARACTERISTICS OF WING-BODY COMBINATIONS. Jim Rogers Thompson and Charles W. Mathews. December 31, 1948. 29p. diags., photos., 2 tabs. (NACA RM L8K01)

REDUCTION OF PROFILE DRAG AT SUPERSONIC VELOCITIES BY THE USE OF AIRFOIL SECTIONS HAVING A BLUNT TRAILING EDGE. Dean R. Chapman. November 1, 1949. 31p. diags., photo. (NACA RM A9H11)

EFFECT OF AIRFOIL SECTION AND TIP TANKS ON THE AERODYNAMIC CHARACTERISTICS AT HIGH SUBSONIC SPEEDS OF AN UNSWEPT WING OF ASPECT RATIO 5.16 AND TAPER RATIO 0.61. H. Norman Silvers and Kenneth P. Spreemann. December 1, 1949. 30p. diags., photos., 2 tabs. (NACA RM L9J04)

FLIGHT INVESTIGATION AT MACH NUMBERS FROM 0.6 to 1.7 TO DETERMINE DRAG AND BASE PRESSURES ON A BLUNT-TRAILING-EDGE AIRFOIL AND DRAG OF DIAMOND AND CIRCULAR-ARC AIRFOILS AT ZERO LIFT. John D. Morrow and Ellis Katz. August 11, 1950. 25p. diags., photos. (NACA RM L50E19a)

MEASUREMENTS OF THE EFFECT OF TRAILING-EDGE THICKNESS ON THE ZERO-LIFT DRAG OF THIN LOW-ASPECT-RATIO WINGS. John D. Morrow. August 14, 1950. 12p. diags., photo. (NACA RM L50F26)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.38 OF FOUR WINGS OF ASPECT RATIO 4 HAVING QUARTER-CHORD SWEEP ANGLES OF  $0^\circ$ ,  $35^\circ$ ,  $45^\circ$ , AND  $60^\circ$ . William B. Kemp, Jr., Kenneth W. Goodson and Robert A. Booth. October 10, 1950. 41p. diags., photos., tab. (NACA RM L50G14)

THE EFFECTS OF MACH NUMBER AND REYNOLDS NUMBER ON THE AERODYNAMIC CHARACTERISTICS OF SEVERAL 12-PERCENT-THICK WINGS HAVING  $35^\circ$  OF SWEEPBACK AND VARIOUS AMOUNTS OF CAMBER. Bruce E. Tinling and W. Richard Kolb. February 23, 1951. 68p. diags., photo., tab. (NACA RM A50K27)

THE TRANSONIC CHARACTERISTICS OF 17 RECTANGULAR, SYMMETRICAL WING MODELS OF VARYING ASPECT RATIO AND THICKNESS. Warren H. Nelson and John B. McDevitt. May 10, 1951. 91p. diags., photos. (NACA RM A51A12)

COMPARISON OF AIRFOIL SECTIONS ON TWO TRIANGULAR-WING-FUSELAGE CONFIGURATIONS AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Albert W. Hall and James M. McKay. August 1951. 23p. diags., photo., tab. (NACA RM L51F01)

SUMMARY OF RESULTS OBTAINED BY TRANSONIC-BUMP METHOD ON EFFECTS OF PLAN FORM AND THICKNESS OF LIFT AND DRAG CHARACTERISTICS OF WINGS AT TRANSONIC SPEEDS. Edward C. Polhamus. November 1951. 33p. diags., tab. (NACA RM L51H30)

THE EFFECTS AT TRANSONIC SPEEDS OF THICKENING THE TRAILING EDGE OF A WING WITH A 4-PERCENT-THICK CIRCULAR-ARC AIRFOIL. Joseph W. Cleary and George L. Stevens. December 1951. 43p. diags., photo. (NACA RM A51J11)

THE TRANSONIC CHARACTERISTICS OF 38 CAMBERED RECTANGULAR WINGS OF VARYING ASPECT RATIO AND THICKNESS AS DETERMINED BY THE TRANSONIC-BUMP TECHNIQUE. Warren H. Nelson and Walter J. Krumm. July 1952. 173p. diags., photos. (NACA RM A52D11)

EFFECT OF TRAILING-EDGE THICKNESS ON LIFT AT SUPERSONIC VELOCITIES. Dean R. Chapman and Robert H. Kester. July 1952. 24p. diags., photos. (NACA RM A52D17)

EFFECTS OF PLAN FORM, AIRFOIL SECTION, AND ANGLE OF ATTACK ON THE PRESSURES ALONG THE BASE OF BLUNT-TRAILING-EDGE WINGS AT MACH NUMBERS OF 1.41, 1.62, AND 1.96. Kenneth L. Goin. September 1952. 52p. photos., diags. (NACA RM L52D21)

FORCE TESTS OF THREE THIN WINGS OF MODERATELY LOW ASPECT RATIO AT HIGH SUBSONIC MACH NUMBERS. Gareth H. Jordan. October 1952. 22p. diags. (NACA RM L52I08)

AERODYNAMIC CHARACTERISTICS OF TWO DELTA WINGS AT MACH NUMBER 4.04 AND CORRELATIONS OF LIFT AND MINIMUM-DRAG DATA FOR DELTA WINGS AT MACH NUMBERS FROM 1.62 TO 6.9. Edward F. Ulmann and Robert W. Dunning. December 1952. 20p. diags. (NACA RM L52K19)

INVESTIGATION OF THREE TAPERED  $45^\circ$  SWEEPBACK CAMBERED AND TWISTED WINGS COVERING A SIMULTANEOUS VARIATION IN ASPECT RATIO AND THICKNESS RATIO AND OF ONE RELATED SYMMETRICAL WING AT TRANSONIC SPEEDS BY THE WING-FLOW METHOD. Harold I. Johnson. March 1953. 55p. diags., photos., 2 tabs. (NACA RM L52H07)

A CORRELATION BY MEANS OF TRANSONIC SIMILARITY RULES OF THE EXPERIMENTALLY DETERMINED CHARACTERISTICS OF 18 CAMBERED WINGS OF RECTANGULAR PLAN FORM. John B. McDevitt. September 1953. 57p. diags. (NACA RM A53G31)

TABLES FOR THE COMPUTATION OF WAVE DRAG OF ARROW WINGS OF ARBITRARY AIRFOIL SECTION. Frederick C. Grant and Morton Cooper. June 1954. 9p. diag., 28p. tabs. (in pocket) (NACA TN 3185)

Aspect Ratio  
(1.2.2.2.2)

MEASUREMENTS OF THE EFFECTS OF THICKNESS RATIO AND ASPECT RATIO ON THE DRAG OF RECTANGULAR-PLAN-FORM AIRFOILS AT TRANSONIC SPEEDS. Jim Rogers Thompson and Charles W. Mathews. June 20, 1947. 17p. diags., photo. (NACA RM L7E08)



## Aspect Ratio - Complete Wings (Cont.)

APPLICATION OF ONE PART OF VON KARMAN'S TWO-DIMENSIONAL TRANSONIC SIMILARITY LAW TO DRAG DATA OF NACA 65-SERIES WINGS. Kenneth B. Amer. August 24, 1948. 9p. diagrs. (NACA RM L8F24)

LANDING CHARACTERISTICS OF HIGH-SPEED WINGS. Herbert A. Wilson, Jr. and Laurence K. Loftin, Jr. September 21, 1948. 21p. diagrs. (NACA RM L8A28e)

LOW-SPEED INVESTIGATION OF DEFLECTABLE WING-TIP AILERONS ON AN UNTAPERED 45° SWEEPBACK SEMISPAN WING WITH AND WITHOUT AN END PLATE. Jack Fischel and James M. Watson. December 14, 1949. 32p. diagrs., photo. (NACA RM L9J28)

THE EFFECT OF ASPECT RATIO ON THE SUBSONIC AERODYNAMIC CHARACTERISTICS OF WINGS WITH NACA 65<sub>1</sub>-210 SECTIONS. Warren H. Nelson and Albert L. Erickson. February 3, 1950. 31p. diagrs., photos., tab. (NACA RM A9K18)

AERODYNAMIC INVESTIGATION AT MACH NUMBER 1.92 OF A RECTANGULAR WING AND TAIL AND BODY CONFIGURATION AND ITS COMPONENTS. Macon C. Ellis, Jr. and Carl E. Grigsby. March 1, 1950. 96p. diagrs., photos., 4 tabs. (NACA RM L9L28a)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LONGITUDINAL STABILITY AND CONTROL. William B. Kemp, Jr. Robert E. Becht and Albert G. Few, Jr. March 14, 1950. 51p. diagrs., photos. (NACA RM L9K08)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.25 OF A 6-PERCENT-THICK TRIANGULAR WING AND 6- AND 9-PERCENT-THICK TRIANGULAR WINGS IN COMBINATION WITH A FUSELAGE. WING ASPECT RATIO 2.31, BICONVEX AIRFOIL SECTIONS. Albert W. Hall and Garland J. Morris. May 5, 1950. 22p. diagrs., photo., 2 tabs. (NACA RM L50D05)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LATERAL AND DIRECTIONAL STABILITY AND CONTROL. William B. Kemp, Jr. and Robert E. Becht. June 20, 1950. 97p. diagrs., photos. (NACA RM L50C17a)

STABILITY CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL WITH VARIOUS MODIFICATIONS TO THE BASIC MODEL CONFIGURATIONS. Robert E. Becht and Albert G. Few, Jr. August 16, 1950. 47p. diagrs., photo. (NACA RM L50F23)

DAMPING IN ROLL OF RECTANGULAR WINGS OF SEVERAL ASPECT RATIOS AND NACA 65A-SERIES AIRFOIL SECTIONS OF SEVERAL THICKNESS RATIOS AT TRANSONIC AND SUPERSONIC SPEEDS AS DETERMINED WITH ROCKET-POWERED MODELS. James L. Edmondson. August 24, 1950. 16p. diagrs. (NACA RM L50E26)

FLIGHT TESTS AT SUPERSONIC SPEEDS TO DETERMINE THE EFFECT OF TAPER ON THE ZERO-LIFT DRAG OF SWEEPBACK LOW-ASPECT-RATIO WINGS. Murray Pittel. September 5, 1950. 23p. diagrs., photos. (NACA RM L50F30a)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS AT HIGH-SUBSONIC SPEEDS OF TWO MODELS OF A TRANSONIC RESEARCH AIRPLANE WITH WINGS AND HORIZONTAL TAILS OF ASPECT RATIOS 4.2 AND 2. Arvo A. Luoma and John B. Wright. September 29, 1950. 134p. diagrs., photos., 3 tabs. (NACA RM L50H07)

PRELIMINARY EMPIRICAL DESIGN REQUIREMENTS FOR THE PREVENTION OF TUMBLING OF AIRPLANES HAVING NO HORIZONTAL TAILS. Robert L. Bryant. October 11, 1950. 23p. diagrs., 2 tabs. (NACA RM L50H23)

STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL IN THE LANDING CONFIGURATION. Robert E. Becht. December 18, 1950. 38p. diagrs., photos. (NACA RM L50J27)

EFFECT OF AN END PLATE ON THE AERODYNAMIC CHARACTERISTICS OF A 20.55° SWEEPBACK WING WITH AN ASPECT RATIO OF 2.67 AND A TAPER RATIO OF 0.5. TRANSONIC-BUMP METHOD. James M. Watson. December 21, 1950. 15p. diagrs., photo. (NACA RM L50H28a)

THE EFFECT OF END PLATES, END STRUTS, AND DEPTH OF SUBMERGENCE ON THE CHARACTERISTICS OF A HYDROFOIL. Kenneth L. Wadlin, Rudolph E. Fontana and Charles L. Shuford, Jr. April 12, 1951. 84p. diagrs., photos. (NACA RM L51B13)

THE TRANSONIC CHARACTERISTICS OF 17 RECTANGULAR, SYMMETRICAL WING MODELS OF VARYING ASPECT RATIO AND THICKNESS. Warren H. Nelson and John B. McDevitt. May 10, 1951. 91p. diagrs., photos. (NACA RM A51A12)

AERODYNAMIC CHARACTERISTICS OF TAPERED WINGS HAVING ASPECT RATIOS OF 4, 6, AND 8, QUARTER-CHORD LINES SWEEP BACK 45°, AND NACA 631A012 AIRFOIL SECTIONS. TRANSONIC-BUMP METHOD. Edward C. Polhamus and Thomas J. King, Jr. June 13, 1951. 23p. diagrs., photos., 2 tabs. (NACA RM L51C26)

COMPARISON OF AIRFOIL SECTIONS ON TWO TRIANGULAR-WING-FUSELAGE CONFIGURATIONS AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Albert W. Hall and James M. McKay. August 1951. 23p. diagrs., photo., tab. (NACA RM L51F01)

INVESTIGATION OF WING-TIP AILERONS ON A 51.3° SWEEPBACK WING AT TRANSONIC SPEEDS BY THE TRANSONIC-BUMP METHOD. William C. Moseley, Jr. and James M. Watson. November 1951. 60p. diagrs. (NACA RM L51H27)

SUMMARY OF RESULTS OBTAINED BY TRANSONIC-BUMP METHOD ON EFFECTS OF PLAN FORM AND THICKNESS OF LIFT AND DRAG CHARACTERISTICS OF WINGS AT TRANSONIC SPEEDS. Edward C. Polhamus. November 1951. 33p. diagrs., tab. (NACA RM L51H30)

EFFECTS OF HORIZONTAL-TAIL POSITION, AREA, AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 60° TRIANGULAR-WING MODEL HAVING VARIOUS TRIANGULAR-ALL-MOVABLE HORIZONTAL TAILS. Byron M. Jaquet. December 1951. 61p. diagrs., photo., tab. (NACA RM L51I06)

PRESSURE DISTRIBUTION AT LOW SPEED ON A 1/4-SCALE BELL X-5 AIRPLANE MODEL. William B. Kemp, Jr. and Albert G. Few, Jr. December 1951. 86p. diagrs., photos. (NACA RM L51I25)



Aspect Ratio - Complete Wings  
(Cont.)

INVESTIGATION OF THE LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A VARIABLE-  
SWEEP AIRPLANE MODEL WITH A TWISTED AND  
CAMBERED WING. William B. Kemp, Jr., Robert  
E. Becht and Albert G. Few, Jr. February 1952.  
62p. diagrs., photos. (NACA RM L51K22)

THE TRANSONIC CHARACTERISTICS OF 38 CAMBERED RECTANGULAR WINGS OF VARYING ASPECT RATIO AND THICKNESS AS DETERMINED BY THE TRANSONIC-BUMP TECHNIQUE. Warren H. Nelson and Walter J. Krumm. July 1952. 173p. diagrs., photos. (NACA RM A52D11)

EFFECT OF TRAILING-EDGE THICKNESS ON LIFT AT SUPERSONIC VELOCITIES. Dean R. Chapman and Robert H. Kester. July 1952. 24p. diagrs., photos. (NACA RM A52D17)

PRELIMINARY STUDY OF SOME FACTORS WHICH AFFECT THE STALL-FLUTTER CHARACTERISTICS OF THIN WINGS. A. Gerald Rainey. July 1952. 33p. diagrs., photo., tab. (NACA RM L52D08)

EFFECTS OF PLAN FORM, AIRFOIL SECTION, AND ANGLE OF ATTACK ON THE PRESSURES ALONG THE BASE OF BLUNT-TRAILING-EDGE WINGS AT MACH NUMBERS OF 1.41, 1.62, AND 1.96. Kenneth L. Goin. September 1952. 52p. photos., diagrs. (NACA RM L52D21)

AN ANALYSIS OF ESTIMATED AND EXPERIMENTAL TRANSONIC DOWNWASH CHARACTERISTICS AS AFFECTED BY PLAN FORM AND THICKNESS FOR WING AND WING-FUSELAGE CONFIGURATIONS. Joseph Weil, George S. Campbell and Margaret S. Diederich. November 1952. 92p. diagrs., 2 tabs. (NACA RM L52I22)

INVESTIGATION OF THREE TAPERED 45° SWEEP-BACK CAMBERED AND TWISTED WINGS COVERING A SIMULTANEOUS VARIATION IN ASPECT RATIO AND THICKNESS RATIO AND OF ONE RELATED SYMMETRICAL WING AT TRANSONIC SPEEDS BY THE WING-FLOW METHOD. Harold I. Johnson. March 1953. 55p. diagrs., photos., 2 tabs. (NACA RM L52H07)

A CORRELATION BY MEANS OF TRANSONIC SIMILARITY RULES OF THE EXPERIMENTALLY DETERMINED CHARACTERISTICS OF 18 CAMBERED WINGS OF RECTANGULAR PLAN FORM. John B. McDevitt. September 1953. 57p. diagrs. (NACA RM A53G31)

LIFT AND PITCHING MOMENT AT SUPERSONIC SPEEDS DUE TO CONSTANT VERTICAL ACCELERATION FOR THIN SWEEPBACK TAPERED WINGS WITH STREAMWISE TIPS. SUPERSONIC LEADING AND TRAILING EDGES. Isabella J. Cole and Kenneth Margolis. July 1954. 67p. diagrs., 4 tabs. (NACA TN 3196)

THE HYDRODYNAMIC CHARACTERISTICS OF AN ASPECT-RATIO-0.125 MODIFIED RECTANGULAR FLAT PLATE OPERATING NEAR A FREE WATER SURFACE. John A. Ramsen and Victor L. Vaughan, Jr. October 1954. 32p. diagrs. (NACA TN 3249)

COMPARISON OF FLUTTER CALCULATIONS USING VARIOUS AERODYNAMIC COEFFICIENTS WITH EXPERIMENTAL RESULTS FOR SOME RECTANGULAR CANTILEVER WINGS AT MACH NUMBER 1.3. Herbert C. Nelson and Ruby A. Rainey. November 1954. 22p. diagrs., 2 tabs. (NACA TN 3301)

A NOTE ON THE DRAG DUE TO LIFT OF RECTANGULAR WINGS OF LOW ASPECT RATIO. Edward C. Polhamus. January 1955. 24p. diagrs. (NACA TN 3324)

ON SLENDER DELTA WINGS WITH LEADING-EDGE SEPARATION. Clinton E. Brown and William H. Michael, Jr. April 1955. 27p. diagrs. (NACA TN 3430)

ON THE KERNEL FUNCTION OF THE INTEGRAL EQUATION RELATING LIFT AND DOWNWASH DISTRIBUTIONS OF OSCILLATING WINGS IN SUPERSONIC FLOW. Charles E. Watkins and Julian H. Berman. May 1955. 43p. (NACA TN 3438)

Sweep  
(1.2.2.2.3)

DRAG MEASUREMENTS OF A 34° SWEEP-FORWARD AND SWEEP-BACK NACA 65-009 AIRFOIL OF ASPECT RATIO 2.7 AS DETERMINED BY FLIGHT TESTS AT SUPERSONIC SPEEDS. Sidney R. Alexander. February 20, 1947. 11p. diagrs., photos. (NACA RM L6I11)

DRAG OF A WING-BODY CONFIGURATION CONSISTING OF A SWEEP-FORWARD TAPERED WING MOUNTED ON A BODY OF FINENESS RATIO 12 MEASURED DURING FREE FALL AT TRANSONIC SPEEDS. Jim Rogers Thompson and Charles W. Mathews. March 13, 1947. 15p. diagrs., photos. (NACA RM L6L24)

DRAG MEASUREMENTS OF A SWEEP-BACK WING HAVING INVERSE TAPER AS DETERMINED BY FLIGHT TESTS AT SUPERSONIC SPEEDS. Sidney R. Alexander. April 8, 1947. 12p. diagrs., photo. (NACA RM L6L30)

OBSERVATIONS ON AN AILERON-FLUTTER INSTABILITY ENCOUNTERED ON A 45° SWEEP-BACK WING IN TRANSONIC AND SUPERSONIC FLIGHT. Marvin Pitkin, William N. Gardner and Howard J. Curfman, Jr. April 11, 1947. 23p. diagrs., photos. (NACA RM L6L09)

FLIGHT TESTS TO DETERMINE THE EFFECT OF TAPER ON THE ZERO-LIFT DRAG OF WINGS AT LOW SUPERSONIC SPEEDS. Sidney R. Alexander and Robert L. Nelson. July 13, 1947. 19p. diagrs., photos. (NACA RM L7E26)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEEPBACK WING AND TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. Richard H. Sawyer and Lindsay J. Lina. July 23, 1948. 42p. diagrs., photos., tab. (NACA RM L8B19)

LANDING CHARACTERISTICS OF HIGH-SPEED WINGS. Herbert A. Wilson, Jr. and Laurence K. Loftin, Jr. September 21, 1948. 21p. diagrs. (NACA RM L8A28e)

AN INVESTIGATION OF THE LOW-SPEED STATIC STABILITY CHARACTERISTICS OF COMPLETE MODELS HAVING SWEEPBACK AND SWEEP FORWARD WINGS. M. Leroy Spearman and Paul Comisarow. November 19, 1948. 51p. diagrs., tab. photos. (NACA RM L8H31)

EFFECT OF WING SWEEP, TAPER, AND THICKNESS RATIO ON THE TRANSONIC DRAG CHARACTERISTICS OF WING-BODY COMBINATIONS. Jim Rogers Thompson and Charles W. Mathews. December 31, 1948. 29p. diagrs., photos., 2 tabs. (NACA RM L8K01)



## Sweep - Complete Wings (Cont.)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $45^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Joseph Weil and Kenneth W. Goodson. February 24, 1949. 28p. diagrs., photo., tab. (NACA RM L9A21)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $35^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and Robert E. Becht. April 21, 1949. 29p. diagrs., photo., tab. (NACA RM L9B25)

**HIGH-SUBSONIC DAMPING-IN-ROLL CHARACTERISTICS OF A WING WITH THE QUARTER-CHORD LINE SWEEP BACK  $35^\circ$  AND WITH ASPECT RATIO 3 AND TAPER RATIO 0.6.** Boyd C. Myers, II and Richard E. Kuhn. May 10, 1949. 21p. diagrs., photo., tab. (NACA RM L9C23)

EFFECTS OF MACH NUMBER AND SWEEP ON THE DAMPING-IN-ROLL CHARACTERISTICS OF WINGS OF ASPECT RATIO 4. Richard E. Kuhn and Boyd C. Myers, II. June 27, 1949. 28p. diagrs., photo. (NACA RM L9E10)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $45^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.3, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and Thomas J. King, Jr. July 20, 1949. 28p. diagrs., photo., tab. (NACA RM L9E25)

DAMPING-IN-ROLL CHARACTERISTICS OF A  $42.7^\circ$  SWEEP-BACK WING AS DETERMINED FROM A WIND-TUNNEL INVESTIGATION OF A TWISTED SEMISPAN WING. Vernard E. Lockwood. August 8, 1949. 23p. diagrs. (NACA RM L9F15)

EFFECT OF SWEEPBACK ON THE LOW-SPEED STATIC AND ROLLING STABILITY DERIVATIVES OF THIN TAPERED WINGS OF ASPECT RATIO 4. William Letko and Walter D. Wolhart. August 9, 1949. 36p. diagrs., photo. (NACA RM L9F14)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK  $45^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Raymond D. Vogler. August 15, 1949. 22p. diagrs. (NACA RM L9F29a)

AERODYNAMIC CHARACTERISTICS OF A DELTA WING WITH LEADING EDGE SWEEP BACK  $45^\circ$ , ASPECT RATIO 4, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and Robert E. Becht. September 6, 1949. 29p. diagrs., photo., tab. (NACA RM L9G22a)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $60^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Thomas J. King, Jr. and Boyd C. Myers, II. September 6, 1949. 32p. diagrs., photos., tab. (NACA RM L9G27)

INVESTIGATION OF EXTENSIBLE WING-TIP AILERONS ON AN UNTAPERED SEMISPAN WING AT  $0^\circ$  AND  $45^\circ$  SWEEPBACK. John R. Hagerman and William M. O'Hare. September 20, 1949. 40p. diagrs., photo., tab. (NACA RM L9H04)

AERODYNAMIC CHARACTERISTICS OF A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth W. Goodson and William D. Morrison, Jr. October 21, 1949. 32p. diagrs., photos., tab. (NACA RM L9H22)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $45^\circ$ , ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth W. Goodson and Albert G. Few, Jr. November 1, 1949. 34p. diagrs., photos., tab. (NACA RM L9I08)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $35^\circ$ , ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and William D. Morrison, Jr. December 12, 1949. 32p. diagrs., photos., tab. (NACA RM L9K10a)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK  $35^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Robert F. Thompson. January 25, 1950. 22p. diagrs., tab. (NACA RM L9L12a)

MAXIMUM-LIFT INVESTIGATION AT MACH NUMBERS FROM 0.05 TO 1.20 OF A WING WITH LEADING EDGE SWEEP BACK  $42^\circ$ . Thomas R. Turner. February 14, 1950. 21p. diagrs. (NACA RM L9K03)

EXPLORATORY INVESTIGATION OF LEADING-EDGE CHORD-EXTENSIONS TO IMPROVE THE LONGITUDINAL STABILITY CHARACTERISTICS OF TWO  $52^\circ$  SWEEPBACK WINGS. G. Chester Furlong. March 10, 1950. 32p. diagrs., photo. (NACA RM L50A30)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LONGITUDINAL STABILITY AND CONTROL. William B. Kemp, Jr. Robert E. Becht and Albert G. Few, Jr. March 14, 1950. 51p. diagrs., photos. (NACA RM L9K08)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.25 OF A 6-PERCENT-THICK TRIANGULAR WING AND 6- AND 9-PERCENT-THICK TRIANGULAR WINGS IN COMBINATION WITH A FUSELAGE. WING ASPECT RATIO 2.31, BICONVEX AIRFOIL SECTIONS. Albert W. Hall and Garland J. Morris. May 5, 1950. 22p. diagrs., photo., 2 tabs. (NACA RM L50D05)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LATERAL AND DIRECTIONAL STABILITY AND CONTROL. William B. Kemp, Jr. and Robert E. Becht. June 20, 1950. 97p. diagrs., photos. (NACA RM L50C17a)

INVESTIGATION AT HIGH SUBSONIC SPEEDS OF METHODS OF ALLEVIATING THE ADVERSE INTERFERENCE AT THE ROOT OF A SWEEPBACK WING. Lee E. Boddy. August 10, 1950. 31p. diagrs., photos. (NACA RM A50E26)

STABILITY CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL WITH VARIOUS MODIFICATIONS TO THE BASIC MODEL CONFIGURATIONS. Robert E. Becht and Albert G. Few, Jr. August 16, 1950. 47p. diagrs., photo. (NACA RM L50F23)



## AERODYNAMICS

### 28 WINGS (1.2)

#### Sweep - Complete Wings (Cont.)

WING-FLOW MEASUREMENTS OF LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A CANARD AIRPLANE CONFIGURATION WITH A 45° SWEEPBACK WING AND A TRIANGULAR ALL-MOVABLE CONTROL SURFACE. Harold L. Crane and James J. Adams. August 25, 1950. 53p. diagrs., photo. (NACA RM L50A31)

FLIGHT TESTS AT SUPERSONIC SPEEDS TO DETERMINE THE EFFECT OF TAPER ON THE ZERO-LIFT DRAG OF SWEEPBACK LOW-ASPECT-RATIO WINGS. Murray Pittel. September 5, 1950. 23p. diagrs., photos. (NACA RM L50F30a)

TRANSONIC DRAG CHARACTERISTICS OF A WING-BODY COMBINATION USING A THIN TAPERED WING OF 45° SWEEPBACK. Max C. Kurbjun and Stanley Faber. September 28, 1950. 14p. diagrs., photo., tab. (NACA RM L50H22)

EFFECTS OF SWEEP ON THE MAXIMUM-LIFT CHARACTERISTICS OF FOUR ASPECT-RATIO-4 WINGS AT TRANSONIC SPEEDS. Thomas R. Turner. October 3, 1950. 25p. diagrs. (NACA RM L50H11)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.38 OF FOUR WINGS OF ASPECT RATIO 4 HAVING QUARTER-CHORD SWEEP ANGLES OF 0°, 35°, 45°, AND 60°. William B. Kemp, Jr., Kenneth W. Goodson and Robert A. Booth. October 10, 1950. 41p. diagrs., photos., tab. (NACA RM L50G14)

LOW-SPEED INVESTIGATION OF THE EFFECT OF SEVERAL FLAP AND SPOILER AILERONS ON THE LATERAL CHARACTERISTICS OF A 47.5° SWEEPBACK-WING - FUSELAGE COMBINATION AT A REYNOLDS NUMBER OF  $4.4 \times 10^6$ . Jerome Pasamanick and Thomas B. Sellers. December 8, 1950. 57p. diagrs., photo. (NACA RM L50J20)

EFFECTS OF SWEEP ON THE DAMPING-IN-ROLL CHARACTERISTICS OF THREE SWEEPBACK WINGS HAVING AN ASPECT RATIO OF 4 AT TRANSONIC SPEEDS. Vernard E. Lockwood. December 14, 1950. 23p. diagrs. (NACA RM L50J19)

STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL IN THE LANDING CONFIGURATION. Robert E. Becht. December 18, 1950. 38p. diagrs., photos. (NACA RM L50J27)

LONGITUDINAL-CONTROL EFFECTIVENESS AND DOWNWASH CHARACTERISTICS AT A MACH NUMBER OF 1.24 OF A 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 AIRPLANE AS DETERMINED BY THE NACA WING-FLOW METHOD. Richard H. Sawyer, Robert M. Kennedy and Garland J. Morris. January 8, 1951. 37p. diagrs., photos., tab. (NACA RM L50K15)

THE EFFECTS OF MACH NUMBER AND REYNOLDS NUMBER ON THE AERODYNAMIC CHARACTERISTICS OF SEVERAL 12-PERCENT-THICK WINGS HAVING 35° OF SWEEPBACK AND VARIOUS AMOUNTS OF CAMBER. Bruce E. Tinling and W. Richard Kolk. February 23, 1951. 68p. diagrs., photo., tab. (NACA RM A50K27)

EFFECT OF A DEFLECTABLE WING-TIP CONTROL ON THE LOW-SPEED LATERAL AND LONGITUDINAL CHARACTERISTICS OF A LARGE-SCALE WING WITH THE LEADING EDGE SWEEP BACK 47.5°. Roy H. Lange and Marvin P. Fink. April 26, 1951. 41p. diagrs., photo., 2 tabs. (NACA RM L51C07)

PRESSURE-DISTRIBUTION MEASUREMENTS OVER A 45° SWEEPBACK WING AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. Edward C. B. Danforth and Thomas C. O'Bryan. June 1951. 42p. diagrs., photos. (NACA RM L51D24)

AERODYNAMIC CHARACTERISTICS OF TAPERED WINGS HAVING ASPECT RATIOS OF 4, 6, AND 8, QUARTER-CHORD LINES SWEEP BACK 45°, AND NACA 631A012 AIRFOIL SECTIONS. TRANSONIC-BUMP METHOD. Edward C. Polhamus and Thomas J. King, Jr. June 13, 1951. 23p. diagrs., photos., 2 tabs. (NACA RM L51C26)

AN EXPERIMENTAL STUDY AT MODERATE AND HIGH SUBSONIC SPEEDS OF THE FLOW OVER WINGS WITH 30° AND 45° OF SWEEPBACK IN CONJUNCTION WITH A FUSELAGE. Richard T. Whitcomb. June 15, 1951. 56p. diagrs., photos. (NACA RM L50K27)

AN EXPERIMENTAL STUDY OF MODERATE AND HIGH SUBSONIC SPEEDS OF THE FLOW OVER WINGS WITH 30° AND 45° OF SWEEPBACK IN CONJUNCTION WITH A FUSELAGE. Richard T. Whitcomb. June 15, 1951. 47p. diagrs., photo. (NACA RM L50K28)

EFFECTS OF SPANWISE THICKNESS VARIATION ON THE AERODYNAMIC CHARACTERISTICS OF 35° AND 45° SWEEPBACK WINGS OF ASPECT RATIO 6. TRANSONIC-BUMP METHOD. William D. Morrison, Jr. and Paul G. Fournier. July 1951. 38p. diagrs., photo. (NACA RM L51D19)

COMPARISON OF AIRFOIL SECTIONS ON TWO TRIANGULAR-WING-FUSELAGE CONFIGURATIONS AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Albert W. Hall and James M. McKay. August 1951. 23p. diagrs., photo., tab. (NACA RM L51F01)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP-TYPE CONTROL. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and Joseph E. Fikes. August 1951. 35p. diagrs. (NACA RM L51F06a)

SMALL-SCALE INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECTS OF THICKENING THE INBOARD SECTION OF A 45° SWEEPBACK WING OF ASPECT RATIO 4, TAPER RATIO 0.3, AND NACA 65A006 AIRFOIL SECTION. Kenneth P. Spreemann and William J. Alford, Jr. August 1951. 21p. diagrs., photo. (NACA RM L51F08a)

EXPERIMENTAL STUDY OF THE EFFECT OF SWEEPBACK ON TRANSONIC AILERON FLUTTER. Lionel L. Levy, Jr. and Earl D. Knechtel. September 1951. 20p. diagrs., photo. (NACA RM A51E04)

LONGITUDINAL FREQUENCY-RESPONSE CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS, INCLUDING A METHOD FOR THE EVALUATION OF TRANSFER FUNCTIONS. William C. Triplett and G. Allan Smith. September 1951. 45p. diagrs., photo. (NACA RM A51G27)

EFFECTS OF SPANWISE THICKNESS VARIATION ON THE TRANSONIC AERODYNAMIC CHARACTERISTICS OF WINGS HAVING 35° OF SWEEPBACK, ASPECT RATIO 4, AND TAPER RATIO 0.60. William D. Morrison, Jr. and Paul G. Fournier. September 1951. 21p. diagrs., photo. (NACA RM L51F28)

THE EFFECTS ON THE AERODYNAMIC CHARACTERISTICS OF REVERSING THE WING OF A TRIANGULAR WING-BODY COMBINATION AT TRANSONIC SPEEDS AS DETERMINED BY THE NACA WING-FLOW METHOD. James M. McKay and Albert W. Hall. October 1951. 22p. diagrs., photo., 2 tabs. (NACA RM L51H23)

LOAD DISTRIBUTION OVER A FUSELAGE IN COMBINATION WITH A SWEEP WING AT SMALL ANGLES OF ATTACK AND TRANSONIC SPEEDS. Maurice D. White and Bonne C. Look. November 1951. 26p. diagrs., photo., tab. (NACA RM A51H15)



## Sweep - Complete Wings (Cont.)

A FLIGHT EVALUATION OF THE LONGITUDINAL STABILITY CHARACTERISTICS ASSOCIATED WITH THE PITCH-UP OF A SWEEP-WING AIRPLANE IN MANEUVERING FLIGHT AT TRANSONIC SPEEDS. Seth B. Anderson and Richard S. Bray. November 1951. 33p. diags., photo., tab. (NACA RM A51I12)

INVESTIGATION OF WING-TIPAILERONS ON A  $51.3^\circ$  SWEEPBACK WING AT TRANSONIC SPEEDS BY THE TRANSONIC-BUMP METHOD. William C. Moseley, Jr. and James M. Watson. November 1951. 60p. diags. (NACA RM L51H27)

SUMMARY OF RESULTS OBTAINED BY TRANSONIC-BUMP METHOD ON EFFECTS OF PLAN FORM AND THICKNESS OF LIFT AND DRAG CHARACTERISTICS OF WINGS AT TRANSONIC SPEEDS. Edward C. Polhamus. November 1951. 33p. diags., tab. (NACA RM L51H30)

AERODYNAMIC CHARACTERISTICS OF A LEADING-EDGE SLAT ON A  $35^\circ$  SWEEPBACK WING FOR MACH NUMBERS FROM 0.30 TO 0.88. John A. Kelly and Nora-Lee F. Hayter. December 1951. 49p. diags., tab. (NACA RM A51H23)

EFFECTS OF HORIZONTAL-TAIL POSITION, AREA, AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A  $60^\circ$  TRIANGULAR-WING MODEL HAVING VARIOUS TRIANGULAR-ALL-MOVABLE HORIZONTAL TAILS. Byron M. Jaquet. December 1951. 61p. diags., photo., tab. (NACA RM L51I06)

PRESSURE DISTRIBUTION AT LOW SPEED ON A  $1/4$ -SCALE BELL X-5 AIRPLANE MODEL. William B. Kemp, Jr. and Albert G. Few, Jr. December 1951. 86p. diags., photos. (NACA RM L51I25)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A WING HAVING  $45^\circ$  SWEEP, ASPECT RATIO 8, TAPER RATIO 0.45, AND AIRFOIL SECTIONS VARYING FROM THE NACA 63A010 SECTION AT THE ROOT TO THE NACA 63A006 SECTION AT THE TIP. William D. Morrison, Jr. and Paul G. Fournier. January 1952. 22p. diags., photo. (NACA RM L51H28)

SMALL-SCALE INVESTIGATION OF THE EFFECTS OF TWIST AND CAMBER ON THE AERODYNAMIC CHARACTERISTICS OF A  $60^\circ 42'$  SWEEPBACK WING OF ASPECT RATIO 1.94. Kenneth P. Spreemann and William J. Alford, Jr. January 1952. 19p. diags., photo., tab. (NACA RM L51I21)

INVESTIGATION OF THE DISTRIBUTION OF LIFT, DRAG, AND PITCHING MOMENT BETWEEN THE WING AND FUSELAGE OF A  $1/30$ -SCALE SEMI-SPAN MODEL OF THE BELL X-5 AIRPLANE AT A MACH NUMBER OF 1.24 BY THE NACA WING-FLOW METHOD. Norman S. Silsby and Garland J. Morris. January 1952. 32p. diags., photos., tab. (NACA RM L51K27)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED  $45^\circ$  SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP TYPE OF CONTROL WITH OVERHANG BALANCE. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and John R. Hagerman. January 1952. 24p. diags. (NACA RM L51L11)

EFFECT OF CURRENT DESIGN TRENDS ON AIRPLANE SPINS AND RECOVERIES. Anshul I. Neihouse. January 1952. 6p. diags. (NACA RM L52A09)

THE EFFECTIVENESS OF WING VORTEX GENERATORS IN IMPROVING THE MANEUVERING CHARACTERISTICS OF A SWEEP-WING AIRPLANE AT TRANSONIC SPEEDS. Norman M. McFadden, George A. Rathert, Jr. and Richard S. Bray. February 1952. 45p. photos., diags., tab. (NACA RM A51J18)

LOW-SPEED WIND-TUNNEL INVESTIGATION OF A FIXED AND A FREE-FLOATING WING-TIPAILERON ON A WING WITH LEADING EDGE SWEEPBACK  $51.3^\circ$ . R. G. MacLeod. February 1952. 17p. diags., photo., tab. (NACA RM L51H16a)

LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF  $60^\circ$  TRIANGULAR-WING AND MODIFIED  $60^\circ$  TRIANGULAR-WING MODELS HAVING HALF-DELTA AND HALF-DIAMOND TIP CONTROLS. Jacob H. Lichtenstein and Byron M. Jaquet. February 1952. 36p. diags., photos., tab. (NACA RM L51K08)

INVESTIGATION OF THE LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A VARIABLE-SWEEP AIRPLANE MODEL WITH A TWISTED AND CAMBERED WING. William B. Kemp, Jr., Robert E. Becht and Albert G. Few, Jr. February 1952. 62p. diags., photos. (NACA RM L51K22)

THE INTERFERENCE EFFECTS OF A BODY ON THE SPANWISE LOAD DISTRIBUTIONS OF TWO  $45^\circ$  SWEEPBACK WINGS OF ASPECT RATIO 8 FROM LOW-SPEED TESTS AT A REYNOLDS NUMBER OF  $4 \times 10^6$ . Albert P. Martina. February 1952. 48p. diags., photo., 2 tabs. (NACA RM L51K23)

FLUTTER INVESTIGATION OF TWO THIN, LOW-ASPECT-RATIO, SWEEP, SOLID, METAL WINGS IN THE TRANSONIC RANGE BY USE OF A FREE-FALLING BODY. W. T. Lauten, Jr. and Maurice A. Sylvester. February 1952. 12p. diags., photo., 2 tabs. (NACA RM L51K28a)

WIND-TUNNEL INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF A THIN SWEEPBACK WING HAVING AN AIRFOIL SECTION DESIGNED FOR HIGH MAXIMUM LIFT. Stanley F. Racisz and Nicholas J. Paradiso. February 1952. 46p. diags., photo., tab. (NACA RM L51L04)

HINGE-MOMENT AND OTHER AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A QUARTER-SPAN SPOILER ON A TAPERED  $45^\circ$  SWEEPBACK WING OF ASPECT RATIO 3. Joseph E. Fikes. February 1952. 22p. diags., photo. (NACA RM L52A03)

PRELIMINARY INVESTIGATION OF CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED  $45^\circ$  SWEEPBACK WING OF ASPECT RATIO 3 HAVING A HORN-BALANCED FULL-SPAN CONTROL. John G. Lowry and Joseph E. Fikes. April 1952. 22p. diags., photo. (NACA RM L52A11)

LOW-SPEED STABILITY CHARACTERISTICS OF A COMPLETE MODEL WITH A WING OF W PLAN FORM. Edward C. Polhamus and Robert E. Becht. April 1952. 27p. diags., photo., tab. (NACA RM L52A25)

EFFECTS OF HORIZONTAL-TAIL POSITION AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A  $60^\circ$  TRIANGULAR-WING MODEL HAVING TWIN TRIANGULAR ALL-MOVABLE TAILS. Byron M. Jaquet. May 1952. 45p. diags., photos. (NACA RM L52B25)



Sweep - Complete Wings (Cont.)

SMALL-SCALE TRANSONIC INVESTIGATION OF THE EFFECTS OF PARTIAL-SPAN LEADING-EDGE CAMBER ON THE AERODYNAMIC CHARACTERISTICS OF A 50° 38' SWEEPBACK WING OF ASPECT RATIO 2.98. William J. Alford, Jr. and Andrew L. Byrnes, Jr. June 1952. 28p. diagrs., photo., tab. (NACA RM L52D08a)

PRELIMINARY STUDY OF SOME FACTORS WHICH AFFECT THE STALL-FLUTTER CHARACTERISTICS OF THIN WINGS. A. Gerald Rainey. July 1952. 33p. diagrs., photo., tab. (NACA RM L52D08)

CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A LINKED FLAP AND SPOILER ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. July 1952. 24p. diagrs., photo. (NACA RM L52D25)

AN INVESTIGATION OF THE LOW-SPEED LONGITUDINAL STABILITY CHARACTERISTICS OF A SWEEP-WING AIRPLANE MODEL WITH TWO MODIFICATIONS TO THE WING-ROOT PLAN FORM. William B. Kemp, Jr. July 1952. 17p. diagrs., tab. (NACA RM L52E07)

SMALL-SCALE TRANSONIC INVESTIGATION OF THE EFFECTS OF FULL-SPAN AND PARTIAL-SPAN LEADING-EDGE FLAPS ON THE AERODYNAMIC CHARACTERISTICS OF A 50° 38' SWEEPBACK WING OF ASPECT RATIO 2.98. Kenneth P. Spremann and William J. Alford, Jr. July 1952. 31p. diagrs., photo. (NACA RM L52E12)

CONTROL EFFECTIVENESS AND HINGE-MOMENT CHARACTERISTICS AT LOW SPEED OF LARGE-CHORD, HORN-BALANCED, FLAP-TYPE CONTROLS ON A TRIANGULAR WING OF ASPECT RATIO 2. Jules B. Dods, Jr. August 1952. 53p. diagrs., photos., 2 tabs. (NACA RM A52F13)

LATERAL-CONTROL INVESTIGATION AT TRANSONIC SPEEDS OF RETRACTABLE SPOILER AND PLUG-TYPE SPOILER-SLOT AILERONS ON A TAPERED 60° SWEEPBACK WING OF ASPECT RATIO 2. TRANSONIC-BUMP METHOD. Alexander D. Hammond and James M. Watson. August 1952. 19p. diagrs. (NACA RM L52F16)

HINGE-MOMENT AND CONTROL-EFFECTIVENESS CHARACTERISTICS OF AN OUTBOARD FLAP WITH AN OVERHANG NOSE BALANCE ON A TAPERED 35° SWEEPBACK WING OF ASPECT RATIO 4. TRANSONIC-BUMP METHOD. Robert F. Thompson and William C. Moseley, Jr. August 1952. 51p. diagrs. (NACA RM L52G08)

EFFECTS OF PLAN FORM, AIRFOIL SECTION, AND ANGLE OF ATTACK ON THE PRESSURES ALONG THE BASE OF BLUNT-TRAILING-EDGE WINGS AT MACH NUMBERS OF 1.41, 1.62, AND 1.96. Kenneth L. Goin. September 1952. 52p. photos., diagrs. (NACA RM L52D21)

THE EFFECT OF VARIOUS AERODYNAMIC BALANCES ON THE LOW-SPEED LATERAL-CONTROL AND HINGE-MOMENT CHARACTERISTICS OF A 0.20-CHORD PARTIAL-SPAN OUTBOARD AILERON ON A WING WITH LEADING EDGE SWEEP BACK 51.3°. Alexander D. Hammond. September 1952. 40 p. diagrs., photo., tab. (NACA RM L52G03)

LOW-SPEED LATERAL-CONTROL INVESTIGATION OF A FLAP-TYPE SPOILER AILERON WITH AND WITHOUT A DEFLECTOR AND SLOT ON A 6-PERCENT-THICK, TAPERED, 45° SWEEPBACK WING OF ASPECT RATIO 4. James M. Watson. September 1952. 11p. diagrs. (NACA RM L52G10)

AN ANALYSIS OF ESTIMATED AND EXPERIMENTAL TRANSONIC DOWNWASH CHARACTERISTICS AS AFFECTED BY PLAN FORM AND THICKNESS FOR WING AND WING-FUSELAGE CONFIGURATIONS. Joseph Weil, George S. Campbell and Margaret S. Diederich. November 1952. 92p. diagrs., 2 tabs. (NACA RM L52I22)

INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECT OF A POSITIVE-LIFT BALANCING TAB ON THE HINGE-MOMENT AND LIFT CHARACTERISTICS OF A FULL-SPAN FLAP ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. November 1952. 22p. diagrs., photo. (NACA RM L52J09)

A WIND-TUNNEL INVESTIGATION AT LOW SPEEDS OF THE AERODYNAMIC CHARACTERISTICS OF VARIOUS SPOILER CONFIGURATIONS ON A THIN 60° DELTA WING. Harleth G. Wiley and Martin Solomon. November 1952. 20p. diagrs. (NACA RM L52J13)

FREE-FLIGHT-TUNNEL INVESTIGATION OF THE LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A MODEL HAVING A FUSELAGE OR RELATIVELY FLAT CROSS SECTION. John W. Paulson and Joseph L. Johnson, Jr. February 1953. 30p. diagrs., photo., tab. (NACA RM L52L22)

INVESTIGATION OF THREE TAPERED 45° SWEEPBACK CAMBERED AND TWISTED WINGS COVERING A SIMULTANEOUS VARIATION IN ASPECT RATIO AND THICKNESS RATIO AND OF ONE RELATED SYMMETRICAL WING AT TRANSONIC SPEEDS BY THE WING-FLOW METHOD. Harold I. Johnson. March 1953. 55p. diagrs., photos., 2 tabs. (NACA RM L52H07)

A COMPARISON OF GUST LOADS MEASURED IN FLIGHT ON A SWEEP-WING AIRPLANE AND AN UNSWEEP-WING AIRPLANE. Jack Funk and Harry C. Mickleboro. June 1953. 16p. diagrs., 2 tabs. (NACA RM L52L02)

SOME OBSERVATIONS ON STALL FLUTTER AND BUFFETING. A. Gerald Rainey. June 1953. 11p. diagrs. (NACA RM L53E15)

THE AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF AN ALL-MOVABLE, TAPERED, 45° SWEEPBACK, ASPECT-RATIO-4 TAIL DEFLECTED ABOUT A SKEWED HINGE AXIS AND EQUIPPED WITH AN INSET UNBALANCING TAB. James M. Watson. September 1953. 40p. diagrs. (NACA RM L53H13)

THE CALCULATION OF PRESSURE ON SLENDER AIRPLANES IN SUBSONIC AND SUPERSONIC FLOW. Max. A. Heaslet and Harvard Lomax. 1954. ii. 11p. diagrs. (NACA Rept. 1185. Formerly TN 2900)

LIFT AND PITCHING MOMENT AT SUPERSONIC SPEEDS DUE TO CONSTANT VERTICAL ACCELERATION FOR THIN SWEEPBACK TAPERED WINGS WITH STREAMWISE TIPS. SUPERSONIC LEADING AND TRAILING EDGES. Isabella J. Cole and Kenneth Margolis. July 1954. 67p. diagrs., 4 tabs. (NACA TN 3196)

LOW-SPEED WIND-TUNNEL INVESTIGATION OF A TRIANGULAR SWEEPBACK AIR INLET IN THE ROOT OF A 45° SWEEPBACK WING. Arvid L. Keith, Jr. and Jack Schiff. January 1955. 65p. diagrs., photos., 5 tabs. (NACA TN 3363. Formerly RM L50I01)

TOTAL LIFT AND PITCHING MOMENT ON THIN ARROWHEAD WINGS OSCILLATING IN SUPERSONIC POTENTIAL FLOW. H. J. Cunningham. May 1955. 43p. diagrs., 4 tabs. (NACA TN 3433)



Taper and Twist  
(1. 2. 2. 4)

DRAG OF A WING-BODY CONFIGURATION CONSISTING OF A SWEEP-FORWARD TAPERED WING MOUNTED ON A BODY OF FINENESS RATIO 12 MEASURED DURING FREE FALL AT TRANSONIC SPEEDS. Jim Rogers Thompson and Charles W. Mathews. March 13, 1947. 15p. diagrs., photos. (NACA RM L6L24)

DRAG MEASUREMENTS OF A SWEEP-BACK WING HAVING INVERSE TAPER AS DETERMINED BY FLIGHT TESTS AT SUPERSONIC SPEEDS. Sidney R. Alexander. April 8, 1947. 12p. diagrs., photo. (NACA RM L6L30)

FLIGHT TESTS TO DETERMINE THE EFFECT OF TAPER ON THE ZERO-LIFT DRAG OF WINGS AT LOW SUPERSONIC SPEEDS. Sidney R. Alexander and Robert L. Nelson. July 13, 1947. 19p. diagrs., photos. (NACA RM L7E26)

FLIGHT TESTS AT SUPERSONIC SPEEDS TO DETERMINE THE EFFECT OF TAPER ON THE ZERO-LIFT DRAG OF SWEEPBACK LOW-ASPECT-RATIO WINGS. Murray Pittel. September 5, 1950. 23p. diagrs., photos. (NACA RM L50F30a)

TRANSONIC DRAG CHARACTERISTICS OF A WING-BODY COMBINATION USING A THIN TAPERED WING OF 45° SWEEPBACK. Max C. Kurbjun and Stanley Faber. September 28, 1950. 14p. diagrs., photo., tab. (NACA RM L50H22)

SMALL-SCALE INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECTS OF THICKENING THE INBOARD SECTION OF A 45° SWEEPBACK WING OF ASPECT RATIO 4, TAPER RATIO 0.3, AND NACA 65A006 AIRFOIL SECTION. Kenneth P. Spreemann and William J. Alford, Jr. August 1951. 21p. diagrs., photo. (NACA RM L51F08a)

INVESTIGATION OF THE LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A VARIABLE-SWEEP AIRPLANE MODEL WITH A TWISTED AND CAMBERED WING. William B. Kemp, Jr., Robert E. Becht and Albert G. Few, Jr. February 1952. 62p. diagrs., photos. (NACA RM L51K22)

THE INTERFERENCE EFFECTS OF A BODY ON THE SPANWISE LOAD DISTRIBUTIONS OF TWO 45° SWEEPBACK WINGS OF ASPECT RATIO 8 FROM LOW-SPEED TESTS AT A REYNOLDS NUMBER OF  $4 \times 10^6$ . Albert P. Martina. February 1952. 48p. diagrs., photo., 2 tabs. (NACA RM L51K23)

INVESTIGATION OF THREE TAPERED 45° SWEEPBACK CAMBERED AND TWISTED WINGS COVERING A SIMULTANEOUS VARIATION IN ASPECT RATIO AND THICKNESS RATIO AND OF ONE RELATED SYMMETRICAL WING AT TRANSONIC SPEEDS BY THE WING-FLOW METHOD. Harold I. Johnson. March 1953. 55p. diagrs., photos., 2 tabs. (NACA RM L52H07)

LIFT AND PITCHING MOMENT AT SUPERSONIC SPEEDS DUE TO CONSTANT VERTICAL ACCELERATION FOR THIN SWEEPBACK TAPERED WINGS WITH STREAMWISE TIPS. SUPERSONIC LEADING AND TRAILING EDGES. Isabella J. Cole and Kenneth Margolis. July 1954. 67p. diagrs., 4 tabs. (NACA TN 3196)

THE ZERO-LIFT WAVE DRAG OF A PARTICULAR FAMILY OF UNSWEPT, TAPERED WINGS WITH LINEARLY VARYING THICKNESS RATIO. Arthur Henderson, Jr. and Julia M. Goodwin. May 1955. 28p. diagrs. (NACA TN 3418)

Surface Conditions  
(1. 2. 2. 2. 6)

EFFECT OF SWEEPBACK ON THE LOW-SPEED STATIC AND ROLLING STABILITY DERIVATIVES OF THIN TAPERED WINGS OF ASPECT RATIO 4. William Letko and Walter D. Wolhart. August 9, 1949. 36p. diagrs., photo. (NACA RM L9F14)

THE EFFECT OF ASPECT RATIO ON THE SUBSONIC AERODYNAMIC CHARACTERISTICS OF WINGS WITH NACA 65<sub>1</sub>-210 SECTIONS. Warren H. Nelson and Albert L. Erickson. February 3, 1950. 31p. diagrs., photos., tab. (NACA RM A9K18)

AERODYNAMIC CHARACTERISTICS WITH FIXED AND FREE TRANSITION OF A MODIFIED DELTA WING IN COMBINATION WITH A FUSELAGE AT HIGH SUBSONIC SPEEDS. Edward C. Polhamus and Thomas J. King, Jr. May 2, 1950. 19p. diagrs., photos. (NACA RM L50C21)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.38 OF FOUR WINGS OF ASPECT RATIO 4 HAVING QUARTER-CHORD SWEEP ANGLES OF 0°, 35°, 45°, AND 60°. William B. Kemp, Jr., Kenneth W. Goodson and Robert A. Booth. October 10, 1950. 41p. diagrs., photos., tab. (NACA RM L50G14)

THE EFFECTIVENESS OF WING VORTEX GENERATORS IN IMPROVING THE MANEUVERING CHARACTERISTICS OF A SWEEP-WING AIRPLANE AT TRANSONIC SPEEDS. Norman M. McFadden, George A. Rathert, Jr. and Richard S. Bray. February 1952. 45p. photos., diagrs., tab. (NACA RM A51J18)

WIND-TUNNEL INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF A THIN SWEEPBACK WING HAVING AN AIRFOIL SECTION DESIGNED FOR HIGH MAXIMUM LIFT. Stanley F. Racisz and Nicholas J. Paradiso. February 1952. 46p. diagrs., photo., tab. (NACA RM L51L04)

EFFECTS OF ROUGHNESS AND REYNOLDS NUMBER ON THE NONLINEAR LIFT CHARACTERISTICS OF A WING WITH MODIFIED HEXAGONAL AIRFOIL SECTIONS. Milton A. Schwartzberg. February 1953. 18p. diagrs., photo. (NACA RM L52L26a)

HOVERING PERFORMANCE OF A HELICOPTER ROTOR USING NACA 8-H-12 AIRFOIL SECTIONS. Robert D. Powell, Jr. August 1954. 14p. diagrs., photos. (NACA TN 3237)

A PRELIMINARY FLIGHT INVESTIGATION OF AN OIL-FLOW TECHNIQUE FOR AIR-FLOW VISUALIZATION. Harold I. Johnson and Robert G. Mungall. October 1954. 33p. diagrs., photos. (NACA RM L54G14a)

Dihedral  
(1. 2. 2. 2. 7)

EFFECT OF DIHEDRAL CHANGE ON THE THEORETICAL DYNAMIC LATERAL RESPONSE CHARACTERISTICS OF A LOW-ASPECT-RATIO STRAIGHT-WING SUPERSONIC AIRPLANE. Donovan R. Heinle. December 7, 1950. 35p. diagrs., 2 tabs. (NACA RM A50H02)



HIGH-LIFT DEVICES  
(1.2.2.3)

INVESTIGATION OF EFFECT OF SPAN AND SPANWISE LOCATION OF PLAIN AND STEPPED SPOILERAILERONS ON LATERAL CONTROL CHARACTERISTICS OF A WING WITH LEADING EDGE SWEEP BACK 51.3°. Jack Fischel and Alexander D. Hammond. January 18, 1950. 59p. diagrs., photos. (NACA RM L9K02)

THE INTERFERENCE EFFECTS OF A BODY ON THE SPANWISE LOAD DISTRIBUTIONS OF TWO 45° SWEEPBACK WINGS OF ASPECT RATIO 8 FROM LOW-SPEED TESTS AT A REYNOLDS NUMBER OF  $4 \times 10^6$ . Albert P. Martina. February 1952. 48p. diagrs., photo., 2 tabs. (NACA RM L51K23)

METHOD FOR CALCULATING THE ROLLING AND YAWING MOMENTS DUE TO ROLLING FOR UNSWEPT WINGS WITH OR WITHOUT FLAPS ORAILERONS BY USE OF NONLINEAR SECTION LIFT DATA. Albert P. Martina. 1954. ii, 16p. diagrs., 11 tabs. (NACA Rept. 1167. Formerly TN 2937)

DYNAMIC STABILITY AND CONTROL CHARACTERISTICS OF A CASCADE-WING VERTICALLY RISING AIRPLANE MODEL IN TAKE-OFFS, LANDINGS, AND HOVERING FLIGHT. Marion O. McKinney, Louis P. Tosti and Edwin E. Davenport. June 1954. 45p. diagrs., photos., tab. (NACA TN 3198)

INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A MODEL WING-PROPELLER COMBINATION AND OF THE WING AND PROPELLER SEPARATELY AT ANGLES OF ATTACK UP TO 90°. John W. Draper and Richard E. Kuhn. November 1954. 72p. diagrs., photos., tab. (NACA TN 3304)

AN INVESTIGATION OF A WING-PROPELLER CONFIGURATION EMPLOYING LARGE-CHORD PLAIN FLAPS AND LARGE-DIAMETER PROPELLERS FOR LOW-SPEED FLIGHT AND VERTICAL TAKE-OFF. Richard E. Kuhn and John W. Draper. December 1954. 94p. diagrs., photos. (NACA TN 3307)

SOME EFFECTS OF PROPELLER OPERATION AND LOCATION ON ABILITY OF A WING WITH PLAIN FLAPS TO DEFLECT PROPELLER SLIPSTREAMS DOWNWARD FOR VERTICAL TAKE-OFF. John W. Draper and Richard E. Kuhn. January 1955. 28p. diagrs., photo. (NACA TN 3360)

INVESTIGATION OF EFFECTIVENESS OF LARGE-CHORD SLOTTED FLAPS IN DEFLECTING PROPELLER SLIPSTREAMS DOWNWARD FOR VERTICAL TAKE-OFF AND LOW-SPEED FLIGHT. Richard E. Kuhn and John W. Draper. January 1955. 42p. diagrs., photo., tab. (NACA TN 3364)

HOVERING FLIGHT TESTS OF A FOUR-ENGINE-TRANSPORT VERTICAL TAKE-OFF AIRPLANE MODEL UTILIZING A LARGE FLAP AND EXTENSIBLE VANES FOR REDIRECTING THE PROPELLER SLIPSTREAM. Louis P. Tosti and Edwin E. Davenport. May 1955. 26p. diagrs., photos., tab. (NACA TN 3440)

Trailing-Edge Flaps  
(1.2.2.3.1)

LANDING CHARACTERISTICS OF HIGH-SPEED WINGS. Herbert A. Wilson, Jr. and Laurence K. Loftin, Jr. September 21, 1948. 21p. diagrs. (NACA RM L8A28e)

AN INVESTIGATION OF THE LOW-SPEED STATIC STABILITY CHARACTERISTICS OF COMPLETE MODELS HAVING SWEEPBACK AND SWEEP FORWARD WINGS. M. Leroy Spearman and Paul Comisarow. November 19, 1948. 51p. diagrs., tab. photos. (NACA RM L8H31)

THE AERODYNAMIC CHARACTERISTICS THROUGHOUT THE SUBSONIC SPEED RANGE OF A THIN, SHARP-EDGED HORIZONTAL TAIL OF ASPECT RATIO 4 EQUIPPED WITH A CONSTANT-CHORD ELEVATOR. Angelo Bandettini and Verlin D. Reed. June 30, 1949. 50p. diagrs., photo. (NACA RM A9E05)

INVESTIGATION OF EFFECT OF SPAN AND SPANWISE LOCATION OF PLAIN AND STEPPED SPOILERAILERONS ON LATERAL CONTROL CHARACTERISTICS OF A WING WITH LEADING EDGE SWEEP BACK 51.3°. Jack Fischel and Alexander D. Hammond. January 18, 1950. 59p. diagrs., photos. (NACA RM L9K02)

THE TIME LAG BETWEEN FLAP DEFLECTION AND FORCE DEVELOPMENT AT A MACH NUMBER OF 4. Walter F. Lindsey and Edward F. Ulmann. February 13, 1950. 11p. diagr., photos. (NACA RM L9L15)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LONGITUDINAL STABILITY AND CONTROL. William B. Kemp, Jr. Robert E. Becht and Albert G. Few, Jr. March 14, 1950. 51p. diagrs., photos. (NACA RM L9K08)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LATERAL AND DIRECTIONAL STABILITY AND CONTROL. William B. Kemp, Jr. and Robert E. Becht. June 20, 1950. 97p. diagrs., photos. (NACA RM L50C17a)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LONGITUDINAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. September 8, 1950. 80p. diagrs., photos., 2 tabs. (NACA RM A50G06)

LOW-SPEED INVESTIGATION OF THE EFFECT OF SEVERAL FLAP AND SPOILERAILERONS ON THE LATERAL CHARACTERISTICS OF A 47.5° SWEEPBACK-WING - FUSELAGE COMBINATION AT A REYNOLDS NUMBER OF  $4.4 \times 10^6$ . Jerome Pasamanick and Thomas B. Sellers. December 8, 1950. 57p. diagrs., photo. (NACA RM L50J20)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.29 OF AN UNSWEPT TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS - TRAILING-EDGE FLAPS DEFLECTED. Louis S. Stivers, Jr. and Alexander W. Malick. December 13, 1950. 45p. diagrs., photo., 5 tabs. (NACA RM A50J09b)

STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL IN THE LANDING CONFIGURATION. Robert E. Becht. December 18, 1950. 38p. diagrs., photos. (NACA RM L50J27)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LATERAL AND DIRECTIONAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. March 16, 1951. 56p. diagrs., photos., tab. (RM A51A16)

EXPERIMENTAL DOWNWASH AND WAKE CHARACTERISTICS AT SUBSONIC AND SUPERSONIC MACH NUMBERS BEHIND AN UNSWEPT, TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS. Harold J. Walker, Louis S. Stivers, Jr. and Luther Beard, Jr. April 20, 1951. 43p. diagrs. (NACA RM A51B16)



## Trailing-Edge Flaps - Complete Wings (Cont.)

EFFECT OF A DEFLECTABLE WING-TIP CONTROL ON THE LOW-SPEED LATERAL AND LONGITUDINAL CHARACTERISTICS OF A LARGE-SCALE WING WITH THE LEADING EDGE SWEEP BACK  $47.5^\circ$ . Roy H. Lange and Marvin P. Fink. April 26, 1951. 41p. diagrs., photo., 2 tabs. (NACA RM L51C07)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED  $45^\circ$  SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP-TYPE CONTROL. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and Joseph E. Fikes. August 1951. 35p. diagrs. (NACA RM L51F06a)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED  $45^\circ$  SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP TYPE OF CONTROL WITH OVERHANG BALANCE. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and John R. Hagerman. January 1952. 24p. diagrs. (NACA RM L51L11)

INVESTIGATION OF THE LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A VARIABLE-SWEEP AIRPLANE MODEL WITH A TWISTED AND CAMBERED WING. William B. Kemp, Jr., Robert E. Becht and Albert G. Few, Jr. February 1952. 62p. diagrs., photos. (NACA RM L51K22)

WIND-TUNNEL INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF A THIN SWEEPBACK WING HAVING AN AIRFOIL SECTION DESIGNED FOR HIGH MAXIMUM LIFT. Stanley F. Racisz and Nicholas J. Paradiso. February 1952. 46p. diagrs., photo., tab. (NACA RM L51L04)

PRELIMINARY INVESTIGATION OF THE EFFECTS OF A PADDLE BALANCE ON THE CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED  $45.58^\circ$  SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP-TYPE CONTROL. William C. Moseley, Jr. February 1952. 24p. diagrs., photo. (NACA RM L51L19)

FULL-SCALE WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF WING MODIFICATIONS AND HORIZONTAL-TAIL LOCATION ON THE LOW-SPEED STATIC LONGITUDINAL CHARACTERISTICS OF A  $35^\circ$  SWEEP-WING AIRPLANE. Ralph L. Maki. April 1952. 54p. diagrs., photos., 7 tabs. (NACA RM A52B05)

PRELIMINARY INVESTIGATION OF CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED  $45^\circ$  SWEEPBACK WING OF ASPECT RATIO 3 HAVING A HORN-BALANCED FULL-SPAN CONTROL. John G. Lowry and Joseph E. Fikes. April 1952. 22p. diagrs., photo. (NACA RM L52A11)

PRELIMINARY INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECT OF BALANCING TABS ON THE HINGE-MOMENT AND OTHER AERODYNAMIC CHARACTERISTICS OF A FULL-SPAN FLAP ON A TAPERED  $45^\circ$  SWEEPBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. April 1952. 27p. diagrs., photo., (NACA RM L52A23)

CONTROL EFFECTIVENESS AND HINGE-MOMENT CHARACTERISTICS AT LOW SPEED OF LARGE-CHORD, HORN-BALANCED, FLAP-TYPE CONTROLS ON A TRIANGULAR WING OF ASPECT RATIO 2. Jules B. Dods, Jr. August 1952. 53p. diagrs., photos., 2 tabs. (NACA RM A52F13)

HINGE-MOMENT AND CONTROL-EFFECTIVENESS CHARACTERISTICS OF AN OUTBOARD FLAP WITH AN OVERHANG NOSE BALANCE ON A TAPERED  $35^\circ$  SWEEPBACK WING OF ASPECT RATIO 4. TRANSONIC-BUMP METHOD. Robert F. Thompson and William C. Moseley, Jr. August 1952. 51p. diagrs. (NACA RM L52G08)

THEORETICAL ANALYSES TO DETERMINE UNBALANCED TRAILING-EDGE CONTROLS HAVING MINIMUM HINGE MOMENTS DUE TO DEFLECTION AT SUPERSONIC SPEEDS. Kenneth L. Goin. November 1952. 52p. diagrs., tab. (NACA RM L51F19)

CHARACTERISTICS OF FLAP-TYPE SPOILER AILERONS AT VARIOUS LOCATIONS ON A  $60^\circ$  DELTA WING WITH A DOUBLE SLOTTED FLAP. Delwin R. Croom. December 1952. 31p. diagrs., 3 tabs. (NACA RM L52J24)

A STUDY OF THE USE OF VARIOUS HIGH-LIFT DEVICES ON THE HORIZONTAL TAIL OF A CANARD AIRPLANE MODEL AS A MEANS OF INCREASING THE ALLOWABLE CENTER-OF-GRAVITY TRAVEL. Joseph L. Johnson, Jr. January 1953. 25p. diagrs., 2 tabs. (NACA RM L52K18a)

EFFECTS OF RATE OF FLAP DEFLECTION ON FLAP HINGE MOMENT AND WING LIFT THROUGH THE MACH NUMBER RANGE FROM 0.32 TO 0.87. Thomas R. Turner. June 1953. 29p. diagrs., photos. (NACA RM L53E11)

## Slots and Slats (1.2.2.3.2)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LONGITUDINAL STABILITY AND CONTROL. William B. Kemp, Jr. Robert E. Becht and Albert G. Few, Jr. March 14, 1950. 51p. diagrs., photos. (NACA RM L9K08)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LATERAL AND DIRECTIONAL STABILITY AND CONTROL. William B. Kemp, Jr. and Robert E. Becht. June 20, 1950. 97p. diagrs., photos. (NACA RM L50C17a)

STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL IN THE LANDING CONFIGURATION. Robert E. Becht. December 18, 1950. 38p. diagrs., photos. (NACA RM L50J27)

PRESSURE DISTRIBUTIONS OVER A RETRACTED LEADING-EDGE SLAT ON A  $40^\circ$  SWEEPBACK WING AT MACH NUMBERS UP TO 0.9. Jones F. Cahill and Gale C. Oberndorfer. January 26, 1951. 36p. diagrs. (NACA RM L50L04a)

AERODYNAMIC CHARACTERISTICS OF A LEADING-EDGE SLAT ON A  $35^\circ$  SWEEPBACK WING FOR MACH NUMBERS FROM 0.30 TO 0.88. John A. Kelly and Nora-Lee F. Hayter. December 1951. 49p. diagrs., tab. (NACA RM A51H23)

PRESSURE DISTRIBUTION AT LOW SPEED ON A 1/4-SCALE BELL X-5 AIRPLANE MODEL. William B. Kemp, Jr. and Albert G. Few, Jr. December 1951. 86p. diagrs., photos. (NACA RM L51I25)

FULL-SCALE WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF WING MODIFICATIONS AND HORIZONTAL-TAIL LOCATION ON THE LOW-SPEED STATIC LONGITUDINAL CHARACTERISTICS OF A  $35^\circ$  SWEEP-WING AIRPLANE. Ralph L. Maki. April 1952. 54p. diagrs., photos., 7 tabs. (NACA RM A52B05)



## AERODYNAMICS

### 34 WINGS (1. 2)

#### Leading-Edge Flaps (1. 2. 2. 3. 3)

EXPLORATORY INVESTIGATION OF LEADING-EDGE CHORD-EXTENSIONS TO IMPROVE THE LONGITUDINAL STABILITY CHARACTERISTICS OF TWO 52° SWEEPBACK WINGS. G. Chester Furlong. March 10, 1950. 32p. diagrs., photo. (NACA RM L50A30)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LONGITUDINAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. September 8, 1950. 80p. diagrs., photos., 2 tabs. (NACA RM A50G06)

DAMPING IN YAW AND STATIC DIRECTIONAL STABILITY OF A CANARD AIRPLANE MODEL AND OF SEVERAL MODELS HAVING FUSELAGES OF RELATIVELY FLAT CROSS SECTION. Joseph L. Johnson. October 16, 1950. 20p. diagrs., tab. (NACA RM L50H30a)

LOW-SPEED INVESTIGATION OF THE EFFECT OF SEVERAL FLAP AND SPOILER AILERONS ON THE LATERAL CHARACTERISTICS OF A 47.5° SWEEPBACK-WING - FUSELAGE COMBINATION AT A REYNOLDS NUMBER OF  $4.4 \times 10^6$ . Jerome Pasamanick and Thomas B. Sellers. December 8, 1950. 57p. diagrs., photo. (NACA RM L50J20)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.29 OF AN UNSWEPT, TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS - LEADING-EDGE FLAPS DEFLECTED. Louis S. Stivers, Jr. and Alexander W. Malick. February 26, 1951. 37p. diagrs., photo., 5 tabs. (NACA RM A50K10)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LATERAL AND DIRECTIONAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. March 16, 1951. 56p. diagrs., photos., tab. (RM A51A16)

EXPERIMENTAL DOWNWASH AND WAKE CHARACTERISTICS AT SUBSONIC AND SUPERSONIC MACH NUMBERS BEHIND AN UNSWEPT, TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS. Harold J. Walker, Louis S. Stivers, Jr. and Luther Beard, Jr. April 20, 1951. 43p. diagrs. (NACA RM A51B16)

EFFECT OF A DEFLECTABLE WING-TIP CONTROL ON THE LOW-SPEED LATERAL AND LONGITUDINAL CHARACTERISTICS OF A LARGE-SCALE WING WITH THE LEADING EDGE SWEEP BACK 47.5°. Roy H. Lange and Marvin P. Fink. April 26, 1951. 41p. diagrs., photo., 2 tabs. (NACA RM L51C07)

SMALL-SCALE TRANSONIC INVESTIGATION OF THE EFFECTS OF FULL-SPAN AND PARTIAL-SPAN LEADING-EDGE FLAPS ON THE AERODYNAMIC CHARACTERISTICS OF A 50° 38' SWEEPBACK WING OF ASPECT RATIO 2.98. Kenneth P. Spreemann and William J. Alford, Jr. July 1952. 31p. diagrs., photo. (NACA RM L52E12)

A STUDY OF THE USE OF VARIOUS HIGH-LIFT DEVICES ON THE HORIZONTAL TAIL OF A CANARD AIRPLANE MODEL AS A MEANS OF INCREASING THE ALLOWABLE CENTER-OF-GRAVITY TRAVEL. Joseph L. Johnson, Jr. January 1953. 25p. diagrs., 2 tabs. (NACA RM L52K18a)

FREE-FLIGHT-TUNNEL INVESTIGATION OF THE LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A MODEL HAVING A FUSELAGE OR RELATIVELY FLAT CROSS SECTION. John W. Paulson and Joseph L. Johnson, Jr. February 1953. 30p. diagrs., photo., tab. (NACA RM L52L22)

#### CONTROLS (1. 2. 2. 4)

FREE-FLIGHT INVESTIGATION OF THE ROLLING EFFECTIVENESS OF A WING-SPOILER ARRANGEMENT AT HIGH SUBSONIC, TRANSONIC, AND SUPERSONIC SPEEDS. Carl A. Sandahl. May 17, 1948. 10p. diagrs., photo. (NACA RM L8A07)

INVESTIGATION OF EXTENSIBLE WING-TIP AILERONS ON AN UNTAPERED SEMISPAN WING AT 0° AND 45° SWEEPBACK. John R. Hagerman and William M. O'Hare. September 20, 1949. 40p. diagrs., photo., tab. (NACA RM L9H04)

LOW-SPEED INVESTIGATION OF DEFLECTABLE WING-TIP AILERONS ON AN UNTAPERED 45° SWEEPBACK SEMISPAN WING WITH AND WITHOUT AN END PLATE. Jack Fischel and James M. Watson. December 14, 1949. 32p. diagrs., photo. (NACA RM L9J28)

INVESTIGATION OF WING-TIP AILERONS ON A 51.3° SWEEPBACK WING AT TRANSONIC SPEEDS BY THE TRANSONIC-BUMP METHOD. William C. Moseley, Jr. and James M. Watson. November 1951. 60p. diagrs. (NACA RM L51H27)

LOW-SPEED WIND-TUNNEL INVESTIGATION OF A FIXED AND A FREE-FLOATING WING-TIP AILERON ON A WING WITH LEADING EDGE SWEEP BACK 51.3°. R. G. MacLeod. February 1952. 17p. diagrs., photo., tab. (NACA RM L51H16a)

METHOD FOR CALCULATING THE ROLLING AND YAWING MOMENTS DUE TO ROLLING FOR UNSWEPT WINGS WITH OR WITHOUT FLAPS OR AILERONS BY USE OF NONLINEAR SECTION LIFT DATA. Albert P. Martina. 1954. ii, 16p. diagrs., 11 tabs. (NACA Rept. 1167. Formerly TN 2937)

#### Flap Type (1. 2. 2. 4. 1)

OBSERVATIONS ON AN AILERON-FLUTTER INSTABILITY ENCOUNTERED ON A 45° SWEEPBACK WING IN TRANSONIC AND SUPERSONIC FLIGHT. Marvin Pitkin, William N. Gardner and Howard J. Curfman, Jr. April 11, 1947. 23p. diagrs., photos. (NACA RM L6L09)

FLIGHT-TEST MEASUREMENTS OF AILERON CONTROL SURFACE BEHAVIOUR AT SUPERCRITICAL MACH NUMBERS. Harvey H. Brown, George A. Rathert, Jr. and Lawrence A. Clousing. April 23, 1947. 26p. diagrs., photos., 2 tabs. (NACA RM A7A15)

HIGH-SPEED WIND-TUNNEL TESTS OF A MODEL PURSUIT AIRPLANE AND CORRELATION WITH FLIGHT-TEST RESULTS. Joseph W. Cleary and Lyle J. Gray. January 21, 1948. 56p. diagrs., photos. (NACA RM A7I16)

WIND-TUNNEL INVESTIGATION AT A MACH NUMBER OF 1.53 OF AN AIRPLANE WITH A TRIANGULAR WING. Richard Scherrer and William R. Wimbrow. January 23, 1948. 74p. diagrs., photos., 2 tabs. (NACA RM A7J05)

QUALITATIVE MEASUREMENTS OF RELATIVE FLAP EFFECTIVENESS AT TRANSONIC SPEEDS ON A SERIES OF FIVE THIN AIRFOILS WITH 25-PERCENT-CHORD FLAPS AND VARIOUS AMOUNTS OF SWEEPBACK. Harold L. Crane and Milton D. McLaughlin. May 17, 1948. 24p. diagrs., photos. (NACA RM L8A22)



## Flap Type Controls - Complete Wings (Cont.)

PRELIMINARY FREE-FLIGHT INVESTIGATION OF THE EFFECT OF AIRFOIL SECTION ON AILERON ROLLING EFFECTIVENESS AT TRANSONIC AND SUPERSONIC SPEEDS. Carl A. Sandahl. June 25, 1948. 6p. diagrs. (NACA RM L8B26)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEEPBACK WING AND TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. Richard H. Sawyer and Lindsay J. Lina. July 23, 1948. 42p. diagrs., photos., tab. (NACA RM L8B19)

ADDITIONAL FREE-FLIGHT TESTS OF THE ROLLING EFFECTIVENESS OF SEVERAL WING-SPOILER ARRANGEMENTS AT HIGH SUBSONIC, TRANSONIC, AND SUPERSONIC SPEEDS. H. Kurt Strass. November 24, 1948. 16p. diagrs., photos. (NACA RM L8I23)

AN INVESTIGATION OF AILERON OSCILLATIONS AT TRANSONIC SPEEDS ON NACA 23012 AND NACA 65-212 AIRFOILS BY THE WING-FLOW METHOD. Harold L. Crane. December 29, 1948. 9p. diagrs., photo. (NACA RM L8K29)

AERODYNAMIC CHARACTERISTICS AT SUBSONIC AND TRANSONIC SPEEDS OF A 42.7° SWEEPBACK WING MODEL HAVING AN AILERON WITH FINITE TRAILING-EDGE THICKNESS. Thomas R. Turner, Vernard E. Lockwood and Raymond D. Vogler. January 12, 1949. 24p. diagrs., photo. (NACA RM L8K02)

FULL-SCALE INVESTIGATION OF A WING WITH THE LEADING EDGE SWEEP BACK 47.5° AND HAVING CIRCULAR-ARC AND FINITE-TRAILING-EDGE-THICKNESS AILERONS. Roy H. Lange. March 11, 1949. 16p. diagrs., photo. (NACA RM L9B02)

MEASUREMENTS OF AERODYNAMIC CHARACTERISTICS OF A 35° SWEEPBACK NACA 65-009 AIRFOIL MODEL WITH 1/4-CHORD HORN-BALANCED FLAP BY THE NACA WING-FLOW METHOD. Harold I. Johnson and B. Porter Brown. April 18, 1949. 59p. diagrs., photo. (NACA RM L9B23a)

WIND-TUNNEL INVESTIGATION AT HIGH SUBSONIC SPEEDS OF THE LATERAL-CONTROL CHARACTERISTICS OF AN AILERON AND A STEPPED SPOILER ON A WING WITH LEADING EDGE SWEEP BACK 51.3°. Leslie E. Schneiter and John R. Hagerman. June 7, 1949. 34p. diagrs., photo. (NACA RM L9D06)

EFFECTS OF MACH NUMBER AND SWEEP ON THE DAMPING-IN-ROLL CHARACTERISTICS OF WINGS OF ASPECT RATIO 4. Richard E. Kuhn and Boyd C. Myers, II. June 27, 1949. 28p. diagrs., photo. (NACA RM L9E10)

THE AERODYNAMIC CHARACTERISTICS THROUGHOUT THE SUBSONIC SPEED RANGE OF A THIN, SHARP-EDGED HORIZONTAL TAIL OF ASPECT RATIO 4 EQUIPPED WITH A CONSTANT-CHORD ELEVATOR. Angelo Bandettini and Verlin D. Reed. June 30, 1949. 50p. diagrs., photo. (NACA RM A9E05)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Raymond D. Vogler. August 15, 1949. 22p. diagrs. (NACA RM L9F29a)

WIND-TUNNEL INVESTIGATION AT LOW TRANSONIC SPEEDS OF THE EFFECTS OF NUMBER OF WINGS ON THE LATERAL-CONTROL EFFECTIVENESS OF AN RM-5 TEST VEHICLE. Harold S. Johnson. November 29, 1949. 15p. diagrs., photo., tab. (NACA RM L9H16)

MEASUREMENTS OF AERODYNAMIC CHARACTERISTICS OF A 35° SWEEPBACK NACA 65-009 AIRFOIL MODEL WITH 1/4-CHORD BEVELLED-TRAILING-EDGE FLAP AND TRIM TAB BY THE NACA WING-FLOW METHOD. Harold I. Johnson and B. Porter Brown. January 6, 1950. 68p. diagrs., photo. (NACA RM L9K11)

THE EFFECT OF TIP TANKS ON THE ROLLING CHARACTERISTICS AT HIGH SUBSONIC MACH NUMBERS OF A WING HAVING AN ASPECT RATIO OF 3 WITH QUARTER-CHORD LINE SWEEP BACK 35°. Richard E. Kuhn and Boyd C. Myers, II. January 17, 1950. 27p. diagrs., photo., 2 tabs. (NACA RM L9J19)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK 35°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Robert F. Thompson. January 25, 1950. 22p. diagrs., tab. (NACA RM L9L12a)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK 60°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Raymond D. Vogler. March 2, 1950. 21p. diagrs. (NACA RM L50A17)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Alexander D. Hammond. March 10, 1950. 20p. diagrs. (NACA RM L50A03)

INVESTIGATION AT HIGH SUBSONIC SPEEDS OF A 45° SWEEPBACK HORIZONTAL TAIL WITH PLAIN AND HORN-BALANCED CONTROL SURFACES. Harold S. Johnson and Robert F. Thompson. March 31, 1950. 44p. diagrs., photo., tab. (NACA RM L50B13)

FLIGHT INVESTIGATION OF THE EFFECT OF THICKENING THE AILERON TRAILING EDGE ON CONTROL EFFECTIVENESS FOR SWEEPBACK TAPERED WINGS HAVING SHARP- AND ROUND-NOSE SECTIONS. H. Kurt Strass and Edison M. Fields. May 2, 1950. 20p. diagrs., photo., tab. (NACA RM L9L19)

AERODYNAMIC AND LATERAL-CONTROL CHARACTERISTICS OF A 1/28-SCALE MODEL OF THE BELL X-1 AIRPLANE WING-FUSELAGE COMBINATION. TRANSONIC-BUMP METHOD. Vernard E. Lockwood. May 5, 1950. 28p. diagrs., tab. (NACA RM L50C22)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE AND SPOILER-TYPE CONTROLS ON A WING WITH QUARTER-CHORD-LINE SWEEPBACK OF 60°, ASPECT RATIO 2, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Alexander D. Hammond. July 18, 1950. 26p. diagrs. (NACA RM L50E09)



## Flap Type Controls - Complete Wings (Cont.)

INVESTIGATION OF FLAP-TYPE AILERONS ON AN UNTAPERED WING HAVING AN ASPECT RATIO OF 3.7, 45° SWEEPBACK, AND AN NACA 65A009 AIR-FOIL SECTION. TRANSONIC-BUMP METHOD. Richard G. MacLeod. August 23, 1950. 18p. diags. (NACA RM L50G03)

INVESTIGATION AT TRANSONIC SPEEDS OF A 35-PERCENT-CHORD AILERON ON A TAPERED WEDGE-TYPE WING OF ASPECT RATIO 2.5 WITH AND WITHOUT A FUSELAGE. Thomas R. Turner and Joseph E. Fikes. September 8, 1950. 25p. diags. (NACA RM L50G13a)

PRELIMINARY FLIGHT INVESTIGATION OF THE WING-DROPPING TENDENCY AND LATERAL-CONTROL CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AT TRANSONIC MACH NUMBERS. George A. Rathert, Jr., L. Stewart Rolls, Lee Winograd and George E. Cooper. September 11, 1950. 14p. diags., photo., tab. (NACA RM A50H03)

MEASUREMENTS OF AERODYNAMIC CHARACTERISTICS OF A 35° SWEEPBACK NACA 65-009 AIR-FOIL MODEL WITH 1/4-CHORD FLAP HAVING A 31-PERCENT-FLAP-CHORD OVERHANG BALANCE BY THE NACA WING-FLOW METHOD. Harold I. Johnson and Harold R. Goodman. September 25, 1950. 38p. diags., photo. (NACA RM L50H09)

LOW-SPEED INVESTIGATION OF THE EFFECT OF SEVERAL FLAP AND SPOILER AILERONS ON THE LATERAL CHARACTERISTICS OF A 47.5° SWEEPBACK-WING - FUSELAGE COMBINATION AT A REYNOLDS NUMBER OF  $4.4 \times 10^6$ . Jerome Pasamanick and Thomas B. Sellers. December 8, 1950. 57p. diags., photo. (NACA RM L50J20)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.29 OF AN UNSWEPT TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS - TRAILING-EDGE FLAPS DEFLECTED. Louis S. Stivers, Jr. and Alexander W. Malick. December 13, 1950. 45p. diags., photo., 5 tabs. (NACA RM A50J09b)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A 60° DELTA WING EQUIPPED WITH A TRIANGULAR PLAN-FORM CONTROL HAVING A SKEWED HINGE AXIS AND AN OVERHANG BALANCE. TRANSONIC-BUMP METHOD. Harleth G. Wiley. February 6, 1951. 31p. diags. (NACA RM L50L01)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.29 OF AN UNSWEPT, TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS - LEADING-EDGE FLAPS DEFLECTED. Louis S. Stivers, Jr. and Alexander W. Malick. February 26, 1951. 37p. diags., photo., 5 tabs. (NACA RM A50K10)

FLIGHT MEASUREMENTS OF THE WING-DROPPING TENDENCY OF A STRAIGHT-WING JET AIRPLANE AT HIGH SUBSONIC MACH NUMBERS. Seth B. Anderson, Edward A. Ernst and Rudolph D. Van Dyke, Jr. April 24, 1951. 16p. diags., photo., tab. (NACA RM A51B28)

EFFECT OF A DEFLECTABLE WING-TIP CONTROL ON THE LOW-SPEED LATERAL AND LONGITUDINAL CHARACTERISTICS OF A LARGE-SCALE WING WITH THE LEADING EDGE SWEEP BACK 47.5°. Roy H. Lange and Marvin P. Fink. April 26, 1951. 41p. diags., photo., 2 tabs. (NACA RM L51C07)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP-TYPE CONTROL. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and Joseph E. Fikes. August 1951. 35p. diags. (NACA RM L51F06a)

AN INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECTS OF CONTROL CHORD AND SPAN ON THE CONTROL CHARACTERISTICS OF A TAPERED WEDGE-TYPE WING OF ASPECT RATIO 2.5. TRANSONIC-BUMP METHOD. Raymond D. Vogler, Vernard E. Lockwood and Thomas R. Turner. September 1951. 36p. diags. (NACA RM L51G03)

THE EFFECT OF RAKING THE AILERON TIPS ON THE LATERAL-CONTROL AND HINGE-MOMENT CHARACTERISTICS OF A 20-PERCENT-CHORD PARTIAL-SPAN OUTBOARD AILERON ON A WING WITH LEADING EDGE SWEEP BACK 51.3°. Alexander D. Hammond. November 1951. 41p. diags., photo., tab. (NACA RM L51H29)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP TYPE OF CONTROL WITH OVERHANG BALANCE. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and John R. Hagerman. January 1952. 24p. diags. (NACA RM L51L11)

PRELIMINARY INVESTIGATION OF THE EFFECTS OF A PADDLE BALANCE ON THE CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45.58° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP-TYPE CONTROL. William C. Moseley, Jr. February 1952. 24p. diags., photo. (NACA RM L51L19)

PRELIMINARY INVESTIGATION OF CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A HORN-BALANCED FULL-SPAN CONTROL. John G. Lowry and Joseph E. Fikes. April 1952. 22p. diags., photo. (NACA RM L52A11)

PRELIMINARY INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECT OF BALANCING TABS ON THE HINGE-MOMENT AND OTHER AERODYNAMIC CHARACTERISTICS OF A FULL-SPAN FLAP ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. April 1952. 27p. diags., photo., (NACA RM L52A23)

AN ANALYSIS OF THE EFFECT OF STRUCTURAL FEEDBACK ON THE FLUTTER OF A CONTROL SURFACE HAVING POWER-BOOST SYSTEM. Robert H. Barnes. June 1952. 29p. diags., photos. (NACA RM A51I25)

CONTROL EFFECTIVENESS AND HINGE-MOMENT CHARACTERISTICS AT LOW SPEED OF LARGE-CHORD, HORN-BALANCED, FLAP-TYPE CONTROLS ON A TRIANGULAR WING OF ASPECT RATIO 2. Jules B. Dods, Jr. August 1952. 53p. diags., photos., 2 tabs. (NACA RM A52F13)

HINGE-MOMENT AND CONTROL-EFFECTIVENESS CHARACTERISTICS OF AN OUTBOARD FLAP WITH AN OVERHANG NOSE BALANCE ON A TAPERED 35° SWEEPBACK WING OF ASPECT RATIO 4. TRANSONIC-BUMP METHOD. Robert F. Thompson and William C. Moseley, Jr. August 1952. 51p. diags. (NACA RM L52G08)



## Flap Type Controls - Complete Wings (Cont.)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A 60° DELTA WING EQUIPPED WITH A CONSTANT-CHORD FLAP-TYPE CONTROL WITH AND WITHOUT AN UNSHIELDED HORN BALANCE. TRANSONIC-BUMP METHOD. Harleth G. Wiley and Leon Zontek. September 1952. 25p. diags. (NACA RM L51H22)

THE EFFECT OF VARIOUS AERODYNAMIC BALANCES ON THE LOW-SPEED LATERAL-CONTROL AND HINGE-MOMENT CHARACTERISTICS OF A 0.20-CHORD PARTIAL-SPAN OUTBOARD AILERON ON A WING WITH LEADING EDGE SWEEP BACK 51.3°. Alexander D. Hammond. September 1952. 40 p. diags., photo., tab. (NACA RM L52G03)

THEORETICAL ANALYSES TO DETERMINE UNBALANCED TRAILING-EDGE CONTROLS HAVING MINIMUM HINGE MOMENTS DUE TO DEFLECTION AT SUPERSONIC SPEEDS. Kenneth L. Goin. November 1952. 52p. diags., tab. (NACA RM L51F19)

INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECT OF A POSITIVE-LIFT BALANCING TAB ON THE HINGE-MOMENT AND LIFT CHARACTERISTICS OF A FULL-SPAN FLAP ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. November 1952. 22p. diags., photo. (NACA RM L52J09)

MEASUREMENTS OF AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF AN UNSWEPT AND UNTAPERED NACA 65-009 AIRFOIL MODEL OF ASPECT RATIO 3 WITH 1/4-CHORD PLAIN FLAP BY THE NACA WING-FLOW METHOD. Harold I. Johnson. June 1953. 35p. diags., photo. (NACA RM L53D21)

EFFECTS OF RATE OF FLAP DEFLECTION ON FLAP HINGE MOMENT AND WING LIFT THROUGH THE MACH NUMBER RANGE FROM 0.32 TO 0.87. Thomas R. Turner. June 1953. 29p. diags., photos. (NACA RM L53E11)

INVESTIGATION AT TRANSONIC SPEEDS OF THE HINGE-MOMENT AND LIFT-EFFECTIVENESS CHARACTERISTICS OF A SINGLE FLAP AND A TANDEM FLAP ON A 60° DELTA WING. Delwin R. Croom and Harleth G. Wiley. July 1953. 16p. diags. (NACA RM L53E28a)

## Spoilers (1. 2. 2. 4. 2)

FREE-FLIGHT INVESTIGATION OF THE ROLLING EFFECTIVENESS OF A WING-SPOILER ARRANGEMENT AT HIGH SUBSONIC, TRANSONIC, AND SUPERSONIC SPEEDS. Carl A. Sandahl. May 17, 1948. 10p. diags., photo. (NACA RM L8A07)

ADDITIONAL FREE-FLIGHT TESTS OF THE ROLLING EFFECTIVENESS OF SEVERAL WING-SPOILER ARRANGEMENTS AT HIGH SUBSONIC, TRANSONIC, AND SUPERSONIC SPEEDS. H. Kurt Strass. November 24, 1948. 16p. diags., photos. (NACA RM L8123)

WIND-TUNNEL INVESTIGATION AT HIGH SUBSONIC SPEEDS OF THE LATERAL-CONTROL CHARACTERISTICS OF AN AILERON AND A STEPPED SPOILER ON A WING WITH LEADING EDGE SWEEP BACK 51.3°. Leslie E. Schneider and John R. Hagerman. June 7, 1949. 34p. diags., photo. (NACA RM L9D06)

INVESTIGATION OF EFFECT OF SPAN AND SPANWISE LOCATION OF PLAIN AND STEPPED SPOILER AILERONS ON LATERAL CONTROL CHARACTERISTICS OF A WING WITH LEADING EDGE SWEEP BACK 51.3°. Jack Fischel and Alexander D. Hammond. January 18, 1950. 59p. diags., photos. (NACA RM L9K02)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE AND SPOILER-TYPE CONTROLS ON A WING WITH QUARTER-CHORD-LINE SWEEPBACK OF 60°, ASPECT RATIO 2, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Alexander D. Hammond. July 18, 1950. 26p. diags. (NACA RM L50E09)

LOW-SPEED INVESTIGATION OF THE EFFECT OF SEVERAL FLAP AND SPOILER AILERONS ON THE LATERAL CHARACTERISTICS OF A 47.5° SWEEPBACK-WING - FUSELAGE COMBINATION AT A REYNOLDS NUMBER OF  $4.4 \times 10^6$ . Jerome Pasamanick and Thomas B. Sellers. December 8, 1950. 57p. diags., photo. (NACA RM L50J20)

HINGE-MOMENT AND OTHER AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A QUARTER-SPAN SPOILER ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Joseph E. Fikes. February 1952. 22p. diags., photo. (NACA RM L52A03)

CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A LINKED FLAP AND SPOILER ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. July 1952. 24p. diags., photo. (NACA RM L52D25)

LATERAL-CONTROL INVESTIGATION AT TRANSONIC SPEEDS OF RETRACTABLE SPOILER AND PLUG-TYPE SPOILER-SLOT AILERONS ON A TAPERED 60° SWEEPBACK WING OF ASPECT RATIO 2. TRANSONIC-BUMP METHOD. Alexander D. Hammond and James M. Watson. August 1952. 19p. diags. (NACA RM L52F16)

LOW-SPEED LATERAL-CONTROL INVESTIGATION OF A FLAP-TYPE SPOILER AILERON WITH AND WITHOUT A DEFLECTOR AND SLOT ON A 6-PERCENT-THICK, TAPERED, 45° SWEEPBACK WING OF ASPECT RATIO 4. James M. Watson. September 1952. 11p. diags. (NACA RM L52G10)

A WIND-TUNNEL INVESTIGATION AT LOW SPEEDS OF THE AERODYNAMIC CHARACTERISTICS OF VARIOUS SPOILER CONFIGURATIONS ON A THIN 60° DELTA WING. Harleth G. Wiley and Martin Solomon. November 1952. 20p. diags. (NACA RM L52J13)

CHARACTERISTICS OF FLAP-TYPE SPOILER AILERONS AT VARIOUS LOCATIONS ON A 60° DELTA WING WITH A DOUBLE SLOTTED FLAP. Delwin R. Croom. December 1952. 31p. diags., 3 tabs. (NACA RM L52J24)

## All Movable (1. 2. 2. 4. 3)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.20 OF AN ALL-MOVABLE TRIANGULAR WING OF ASPECT RATIO 4 ALONE AND WITH A BODY. Louis S. Stivers, Jr. and Alexander W. Malick. February 2, 1950. 45p. diags., photos., tab. (NACA RM A9L01)

LOW-SPEED INVESTIGATION OF DEFLECTABLE WING-TIP ELEVATORS ON A LOW-ASPECT-RATIO UNTAPERED 45° SWEEPBACK SEMISPAN WING WITH AND WITHOUT AN END PLATE. Jack Fischel and William M. O'Hare. June 1, 1950. 21p. diags., photo. (NACA RM L50D19)



### All-Movable Controls - Complete Wings (Cont.)

EFFECT OF A DEFLECTABLE WING-TIP CONTROL ON THE LOW-SPEED LATERAL AND LONGITUDINAL CHARACTERISTICS OF A LARGE-SCALE WING WITH THE LEADING EDGE SWEEP BACK 47.5°. Roy H. Lange and Marvin P. Fink. April 26, 1951. 41p. diagrs., photo., 2 tabs. (NACA RM L51C07)

EFFECTS OF HORIZONTAL-TAIL POSITION, AREA, AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 60° TRIANGULAR-WING MODEL HAVING VARIOUS TRIANGULAR-ALL-MOVABLE HORIZONTAL TAILS. Byron M. Jaquet. December 1951. 61p. diagrs., photo., tab. (NACA RM L51I06)

LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF 60° TRIANGULAR-WING AND MODIFIED 60° TRIANGULAR-WING MODELS HAVING HALF-DELTA AND HALF-DIAMOND TIP CONTROLS. Jacob H. Lichtenstein and Byron M. Jaquet. February 1952. 36p. diagrs., photos., tab. (NACA RM L51K08)

EFFECTS OF HORIZONTAL-TAIL POSITION AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 60° TRIANGULAR-WING MODEL HAVING TWIN TRIANGULAR ALL-MOVABLE TAILS. Byron M. Jaquet. May 1952. 45p. diagrs., photos. (NACA RM L52B25)

AN INVESTIGATION OF LONGITUDINAL CONTROL CHARACTERISTICS OF A WING-TIP CONTROL SURFACE ON A SWEEPBACK WING AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. James P. Trant, Jr. June 1952. 23p. diagrs., photos., tab. (NACA RM L52B15a)

CONTROL EFFECTIVENESS AND HINGE-MOMENT CHARACTERISTICS AT LOW SPEED OF LARGE-CHORD, HORN-BALANCED, FLAP-TYPE CONTROLS ON A TRIANGULAR WING OF ASPECT RATIO 2. Jules B. Dods, Jr. August 1952. 53p. diagrs., photos., 2 tabs. (NACA RM A52F13)

THE AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF AN ALL-MOVABLE, TAPERED, 45° SWEEPBACK, ASPECT-RATIO-4 TAIL DEFLECTED ABOUT A SKEWED HINGE AXIS AND EQUIPPED WITH AN INSET UNBALANCING TAB. James M. Watson. September 1953. 40p. diagrs. (NACA RM L53H13)

THEORETICAL INVESTIGATION OF THE EFFECTS UPON LIFT OF A GAP BETWEEN WING AND BODY OF A SLENDER WING-BODY COMBINATION. Duane W. Dugan and Katsumi Hikido. August 1954. 41p. diagrs. (NACA TN 3224)

### REYNOLDS NUMBER EFFECTS (1.2.2.5)

QUALITATIVE MEASUREMENTS OF RELATIVE FLAP EFFECTIVENESS AT TRANSONIC SPEEDS ON A SERIES OF FIVE THIN AIRFOILS WITH 25-PERCENT-CHORD FLAPS AND VARIOUS AMOUNTS OF SWEEPBACK. Harold L. Crane and Milton D. McLaughlin. May 17, 1948. 24p. diagrs., photos. (NACA RM L8A22)

INVESTIGATION AT SUPERSONIC SPEED ( $M = 1.53$ ) OF THE PRESSURE DISTRIBUTION OVER A 63° SWEEP AIRFOIL OF BICONVEX SECTION AT ZERO LIFT. Charles W. Frick and John W. Boyd. June 10, 1948. 33p. diagrs., photos. (NACA RM A8C22)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEEPBACK WING AND TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. Richard H. Sawyer and Lindsay J. Lina. July 23, 1948. 42p. diagrs., photos., tab. (NACA RM L8B19)

LANDING CHARACTERISTICS OF HIGH-SPEED WINGS. Herbert A. Wilson, Jr. and Laurence K. Loftin, Jr. September 21, 1948. 21p. diagrs. (NACA RM L8A28e)

INVESTIGATION AT SUPERSONIC SPEED ( $M = 1.53$ ) OF THE PRESSURE DISTRIBUTION OVER A 63° SWEEP AIRFOIL OF BICONVEX SECTION AT SEVERAL ANGLES OF ATTACK. John W. Boyd, Elliott D. Katzen and Charles W. Frick. September 24, 1948. 41p. diagrs., photos., tab. (NACA RM A8F22)

EFFECT OF SWEEPBACK ON THE LOW-SPEED STATIC AND ROLLING STABILITY DERIVATIVES OF THIN TAPERED WINGS OF ASPECT RATIO 4. William Letko and Walter D. Wolhart. August 9, 1949. 36p. diagrs., photo. (NACA RM L9F14)

EFFECT OF AIRFOIL SECTION AND TIP TANKS ON THE AERODYNAMIC CHARACTERISTICS AT HIGH SUBSONIC SPEEDS OF AN UNSWEPT WING OF ASPECT RATIO 5.16 AND TAPER RATIO 0.61. H. Norman Silvers and Kenneth P. Spreemann. December 1, 1949. 30p. diagrs., photos., 2 tabs. (NACA RM L9J04)

THE EFFECT OF ASPECT RATIO ON THE SUBSONIC AERODYNAMIC CHARACTERISTICS OF WINGS WITH NACA 651-210 SECTIONS. Warren H. Nelson and Albert L. Erickson. February 3, 1950. 31p. diagrs., photos., tab. (NACA RM A9K18)

MAXIMUM-LIFT INVESTIGATION AT MACH NUMBERS FROM 0.05 TO 1.20 OF A WING WITH LEADING EDGE SWEEP BACK 42°. Thomas R. Turner. February 14, 1950. 21p. diagrs. (NACA RM L9K03)

WING-FLOW MEASUREMENTS OF LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A CANARD AIRPLANE CONFIGURATION WITH A 45° SWEEPBACK WING AND A TRIANGULAR ALL-MOVABLE CONTROL SURFACE. Harold L. Crane and James J. Adams. August 25, 1950. 53p. diagrs., photo. (NACA RM L50A31)

SUMMARY REPORT OF RESULTS OBTAINED DURING DEMONSTRATION TESTS OF THE NORTHROP X-4 AIRPLANES. Melvin Sadoff and Thomas R. Sisk. December 13, 1950. 46p. diagrs., photos., tab. (NACA RM A50I01)

STATIC LONGITUDINAL STABILITY AND DYNAMIC CHARACTERISTICS AT HIGH ANGLES OF ATTACK AND AT LOW REYNOLDS NUMBERS OF A MODEL OF THE X-3 SUPERSONIC RESEARCH AIRPLANE. Sanger M. Burk, Jr. and Burton E. Hultz. February 6, 1951. 76p. diagrs., photos., 4 tabs. (NACA RM L50L19)

THE EFFECTS OF MACH NUMBER AND REYNOLDS NUMBER ON THE AERODYNAMIC CHARACTERISTICS OF SEVERAL 12-PERCENT-THICK WINGS HAVING 35° OF SWEEPBACK AND VARIOUS AMOUNTS OF CAMBER. Bruce E. Tinling and W. Richard Kolk. February 23, 1951. 68p. diagrs., photo., tab. (NACA RM A50K27)

WIND-TUNNEL INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF A THIN SWEEPBACK WING HAVING AN AIRFOIL SECTION DESIGNED FOR HIGH MAXIMUM LIFT. Stanley F. Racisz and Nicholas J. Paradiso. February 1952. 46p. diagrs., photo., tab. (NACA RM L51L04)



## Reynolds Number Effects - Complete Wings (Cont.)

FULL-SCALE WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF WING MODIFICATIONS AND HORIZONTAL-TAIL LOCATION ON THE LOW-SPEED STATIC LONGITUDINAL CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE. Ralph L. Maki. April 1952. 54p. diagrs., photos., 7 tabs. (NACA RM A52B05)

INVESTIGATION OF LIFT AND CENTER OF PRESSURE OF LOW-ASPECT-RATIO, CRUCIFORM, TRIANGULAR, AND RECTANGULAR WINGS IN COMBINATION WITH A SLENDER FUSELAGE AT HIGH SUPERSONIC SPEEDS. Thomas N. Canning and Billy Pat Denardo. June 1952. 28p. diagrs., photos. (NACA RM A52C24)

CONTROL EFFECTIVENESS AND HINGE-MOMENT CHARACTERISTICS AT LOW SPEED OF LARGE-CHORD, HORN-BALANCED, FLAP-TYPE CONTROLS ON A TRIANGULAR WING OF ASPECT RATIO 2. Jules B. Dods, Jr. August 1952. 53p. diagrs., photos., 2 tabs. (NACA RM A52F13)

EFFECTS OF ROUGHNESS AND REYNOLDS NUMBER ON THE NONLINEAR LIFT CHARACTERISTICS OF A WING WITH MODIFIED HEXAGONAL AIRFOIL SECTIONS. Milton A. Schwartzberg. February 1953. 18p. diagrs., photo. (NACA RM L52L26a)

## MACH NUMBER EFFECTS (1.2.2.6)

DRAG MEASUREMENTS OF A 34° SWEEP-FORWARD AND SWEEP-BACK NACA 65-009 AIRFOIL OF ASPECT RATIO 2.7 AS DETERMINED BY FLIGHT TESTS AT SUPERSONIC SPEEDS. Sidney R. Alexander. February 20, 1947. 11p. diagrs., photos. (NACA RM L6111)

DRAG OF A WING-BODY CONFIGURATION CONSISTING OF A SWEEP-FORWARD TAPERED WING MOUNTED ON A BODY OF FINENESS RATIO 12 MEASURED DURING FREE FALL AT TRANSONIC SPEEDS. Jim Rogers Thompson and Charles W. Mathews. March 13, 1947. 15p. diagrs., photos. (NACA RM L6L24)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEEP-BACK TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. John A. Zalovek and Richard H. Sawyer. March 28, 1947. 30p. diagrs., photos., tab. (NACA RM L6K21)

DRAG MEASUREMENTS OF A SWEEP-BACK WING HAVING INVERSE TAPER AS DETERMINED BY FLIGHT TESTS AT SUPERSONIC SPEEDS. Sidney R. Alexander. April 8, 1947. 12p. diagrs., photo. (NACA RM L6L30)

OBSERVATIONS ON AN AILERON-FLUTTER INSTABILITY ENCOUNTERED ON A 45° SWEEP-BACK WING IN TRANSONIC AND SUPERSONIC FLIGHT. Marvin Pitkin, William N. Gardner and Howard J. Curfman, Jr. April 11, 1947. 23p. diagrs., photos. (NACA RM L6L09)

FLIGHT-TEST MEASUREMENTS OF AILERON CONTROL SURFACE BEHAVIOUR AT SUPERCRITICAL MACH NUMBERS. Harvey H. Brown, George A. Rathert, Jr. and Lawrence A. Clousing. April 23, 1947. 26p. diagrs., photos., 2 tabs. (NACA RM A7A15)

FORCE AND LONGITUDINAL CONTROL CHARACTERISTICS OF A 1/16 - SCALE MODEL OF THE BELL XS-1 TRANSONIC RESEARCH AIRPLANE AT HIGH MACH NUMBERS. Axel T. Mattson. May 21, 1947. 32p. diagrs., photo., tab. (NACA RM L7A03)

MEASUREMENTS OF THE EFFECTS OF THICKNESS RATIO AND ASPECT RATIO ON THE DRAG OF RECTANGULAR-PLAN-FORM AIRFOILS AT TRANSONIC SPEEDS. Jim Rogers Thompson and Charles W. Mathews. June 20, 1947. 17p. diagrs., photo. (NACA RM L7E08)

FLIGHT TESTS TO DETERMINE THE EFFECT OF TAPER ON THE ZERO-LIFT DRAG OF WINGS AT LOW SUPERSONIC SPEEDS. Sidney R. Alexander and Robert L. Nelson. July 13, 1947. 19p. diagrs., photos. (NACA RM L7E26)

A TORSIONAL STIFFNESS CRITERION FOR PREVENTING FLUTTER OF WINGS OF SUPERSONIC MISSILES. Bernard Budiansky, Joseph N. Kotanchik and Patrick T. Chiarito. August 28, 1947. 14p. diagrs., tab. (NACA RM L7G02)

AN ANALYSIS OF LONGITUDINAL-CONTROL PROBLEMS ENCOUNTERED IN FLIGHT AT TRANSONIC SPEEDS WITH A JET-PROPELLED AIRPLANE. Harvey H. Brown, L. Stewart Rolls and Lawrence A. Clousing. September 25, 1947. 56p. diagrs., photos., 3 tabs. (NACA RM A7G03)

HIGH-SPEED WIND-TUNNEL TESTS OF A MODEL PURSUIT AIRPLANE AND CORRELATION WITH FLIGHT-TEST RESULTS. Joseph W. Cleary and Lyle J. Gray. January 21, 1948. 56p. diagrs., photos. (NACA RM A7I16)

FLIGHT TESTS TO DETERMINE THE EFFECT OF AIRFOIL SECTION PROFILE AND THICKNESS RATIO ON THE ZERO-LIFT DRAG OF LOW-ASPECT-RATIO WINGS AT SUPERSONIC SPEEDS. Ellis Katz. February 9, 1948. 19p. diagrs., photos. (NACA RM L7K14)

FREE-FLIGHT INVESTIGATION OF THE ROLLING EFFECTIVENESS OF A WING-SPOILER ARRANGEMENT AT HIGH SUBSONIC, TRANSONIC, AND SUPERSONIC SPEEDS. Carl A. Sandahl. May 17, 1948. 10p. diagrs., photo. (NACA RM L8A07)

QUALITATIVE MEASUREMENTS OF RELATIVE FLAP EFFECTIVENESS AT TRANSONIC SPEEDS ON A SERIES OF FIVE THIN AIRFOILS WITH 25-PERCENT-CHORD FLAPS AND VARIOUS AMOUNTS OF SWEEPBACK. Harold L. Crane and Milton D. McLaughlin. May 17, 1948. 24p. diagrs., photos. (NACA RM L8A22)

WIND-TUNNEL INVESTIGATION OF A WING-FUSELAGE COMBINATION WITH EXTERNAL STORES. H. Norman Silvers and Kenneth P. Spreemann. July 9, 1948. 55p. diagrs. (NACA RM L7K20)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL AT TRANSONIC SPEEDS AS OBTAINED BY THE TRANSONIC-BUMP METHOD. Joseph Weil and M. Leroy Spearman. July 19, 1948. 23p. diagrs., tab. (NACA RM L8B03)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEEPBACK WING AND TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. Richard H. Sawyer and Lindsay J. Lina. July 23, 1948. 42p. diagrs., photos., tab. (NACA RM L8B19)

APPLICATION OF ONE PART OF VON KARMAN'S TWO-DIMENSIONAL TRANSONIC SIMILARITY LAW TO DRAG DATA OF NACA 65-SERIES WINGS. Kenneth B. Amer. August 24, 1948. 9p. diagrs. (NACA RM L8F24)



## Mach Number Effects - Complete Wings (Cont.)

EFFECT OF DOWNWASH ON THE ESTIMATED ELEVATOR DEFLECTION REQUIRED FOR TRIM OF THE XS-1 AIRPLANE AT SUPERSONIC SPEEDS. James T. Matthews, Jr. November 1, 1948. 11p. diags. (NACA RM L8H06a)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN MODEL OF A SUPERSONIC AIRPLANE CONFIGURATION AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Norman S. Silsby and James M. McKay. November 8, 1948. 30p. diags., photos., tab. (NACA RM L8G30)

AERODYNAMIC CHARACTERISTICS AT SUBSONIC AND SUPERSONIC MACH NUMBERS OF A THIN TRIANGULAR WING OF ASPECT RATIO 2. I - MAXIMUM THICKNESS AT 20 PERCENT OF THE CHORD. Robert E. Berggren and James L. Summers. November 19, 1948. 41p. diags., photos. (NACA RM A8I16)

ADDITIONAL FREE-FLIGHT TESTS OF THE ROLLING EFFECTIVENESS OF SEVERAL WING-SPOILER ARRANGEMENTS AT HIGH SUBSONIC, TRANSONIC, AND SUPERSONIC SPEEDS. H. Kurt Strass. November 24, 1948. 16p. diags., photos. (NACA RM L8I23)

AERODYNAMIC CHARACTERISTICS AT SUBSONIC AND SUPERSONIC MACH NUMBERS OF A THIN TRIANGULAR WING OF ASPECT RATIO 2. II - MAXIMUM THICKNESS AT MIDCHORD. Harold J. Walker and Robert E. Berggren. December 3, 1948. 41p. diags., photos. (NACA RM A8I20)

AN INVESTIGATION OF AILERON OSCILLATIONS AT TRANSONIC SPEEDS ON NACA 23012 AND NACA 65-212 AIRFOILS BY THE WING-FLOW METHOD. Harold L. Crane. December 29, 1948. 9p. diags., photo. (NACA RM L8K29)

AERODYNAMIC CHARACTERISTICS AT SUBSONIC AND TRANSONIC SPEEDS OF A 42.7° SWEEPBACK WING MODEL HAVING AN AILERON WITH FINITE TRAILING-EDGE THICKNESS. Thomas R. Turner, Vernard E. Lockwood and Raymond D. Vogler. January 12, 1949. 24p. diags., photo. (NACA RM L8K02)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Joseph Weil and Kenneth W. Goodson. February 24, 1949. 28p. diags., photo., tab. (NACA RM L9A21)

MEASUREMENTS OF AERODYNAMIC CHARACTERISTICS OF A 35° SWEEPBACK NACA 65-009 AIRFOIL MODEL WITH 1/4-CHORD HORN-BALANCED FLAP BY THE NACA WING-FLOW METHOD. Harold I. Johnson and B. Porter Brown. April 18, 1949. 59p. diags., photo. (NACA RM L9B23a)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 35°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and Robert E. Becht. April 21, 1949. 29p. diags., photo., tab. (NACA RM L9B25)

HIGH-SUBSONIC DAMPING-IN-ROLL CHARACTERISTICS OF A WING WITH THE QUARTER-CHORD LINE SWEEP BACK 35° AND WITH ASPECT RATIO 3 AND TAPER RATIO 0.6. Boyd C. Myers, II and Richard E. Kuhn. May 10, 1949. 21p. diags., photo., tab. (NACA RM L9C23)

INVESTIGATIONS AT SUPERSONIC SPEEDS OF 22 TRIANGULAR WINGS REPRESENTING TWO AIRFOIL SECTIONS FOR EACH OF 11 APEX ANGLES. Eugene S. Love. May 10, 1949. 100p. diags., photos., 3 tabs. (NACA RM L9D07)

WIND-TUNNEL INVESTIGATION AT HIGH SUBSONIC SPEEDS OF THE LATERAL-CONTROL CHARACTERISTICS OF AN AILERON AND A STEPPED SPOILER ON A WING WITH LEADING EDGE SWEEP BACK 51.3°. Leslie E. Schneider and John R. Hagerman. June 7, 1949. 34p. diags., photo. (NACA RM L9D06)

EFFECTS OF MACH NUMBER AND SWEEP ON THE DAMPING-IN-ROLL CHARACTERISTICS OF WINGS OF ASPECT RATIO 4. Richard E. Kuhn and Boyd C. Myers, II. June 27, 1949. 28p. diags., photo. (NACA RM L9E10)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 4, TAPER RATIO 0.3, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and Thomas J. King, Jr. July 20, 1949. 28p. diags., photo., tab. (NACA RM L9E25)

DAMPING-IN-ROLL CHARACTERISTICS OF A 42.7° SWEEPBACK WING AS DETERMINED FROM A WIND-TUNNEL INVESTIGATION OF A TWISTED SEMISPAN WING. Vernard E. Lockwood. August 8, 1949. 23p. diags. (NACA RM L9F15)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Raymond D. Vogler. August 15, 1949. 22p. diags. (NACA RM L9F29a)

TESTS OF LIFTING SURFACES ON CONICAL AND CYLINDRICAL PORTIONS OF A BODY AT SUBSONIC MACH NUMBERS AND AT A MACH NUMBER OF 1.2. Robert S. Osborne and John B. Wright. September 2, 1949. 22p. diags. (NACA RM L9F29)

AERODYNAMIC CHARACTERISTICS OF A DELTA WING WITH LEADING EDGE SWEEP BACK 45°, ASPECT RATIO 4, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and Robert E. Becht. September 6, 1949. 29p. diags., photo., tab. (NACA RM L9G22a)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 60°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Thomas J. King, Jr. and Boyd C. Myers, II. September 6, 1949. 32p. diags., photos., tab. (NACA RM L9G27)

AERODYNAMIC CHARACTERISTICS OF A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth W. Goodson and William D. Morrison, Jr. October 21, 1949. 32p. diags., photos., tab. (NACA RM L9H22)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth W. Goodson and Albert G. Few, Jr. November 1, 1949. 34p. diags., photos., tab. (NACA RM L9I08)



## Mach Number Effects - Complete Wings (Cont.)

WIND-TUNNEL INVESTIGATION AT LOW TRANSONIC SPEEDS OF THE EFFECTS OF NUMBER OF WINGS ON THE LATERAL-CONTROL EFFECTIVENESS OF AN RM-5 TEST VEHICLE. Harold S. Johnson. November 29, 1949. 15p. diagrs., photo., tab. (NACA RM L9H16)

EFFECT OF AIRFOIL SECTION AND TIP TANKS ON THE AERODYNAMIC CHARACTERISTICS AT HIGH SUBSONIC SPEEDS OF AN UNSWEPT WING OF ASPECT RATIO 5.16 AND TAPER RATIO 0.61. H. Norman Silvers and Kenneth P. Spreemann. December 1, 1949. 30p. diagrs., photos., 2 tabs. (NACA RM L9J04)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEPT BACK  $35^\circ$ , ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and William D. Morrison, Jr. December 12, 1949. 32p. diagrs., photos., tab. (NACA RM L9K10a)

A FREE-FLIGHT TECHNIQUE FOR MEASURING DAMPING IN ROLL BY USE OF ROCKET-POWERED MODELS AND SOME INITIAL RESULTS FOR RECTANGULAR WINGS. James L. Edmondson and E. Claude Sanders, Jr. December 20, 1949. 25p. diagrs., photos. (NACA RM L9I01)

MEASUREMENTS OF AERODYNAMIC CHARACTERISTICS OF A  $35^\circ$  SWEPTBACK NACA 65-009 AIRFOIL MODEL WITH 1/4-CHORD BEVELLED-TRAILING-EDGE FLAP AND TRIM TAB BY THE NACA WING-FLOW METHOD. Harold I. Johnson and B. Porter Brown. January 6, 1950. 68p. diagrs., photo. (NACA RM L9K11)

THE EFFECT OF TIP TANKS ON THE ROLLING CHARACTERISTICS AT HIGH SUBSONIC MACH NUMBERS OF A WING HAVING AN ASPECT RATIO OF 3 WITH QUARTER-CHORD LINE SWEPT BACK  $35^\circ$ . Richard E. Kuhn and Boyd C. Myers, II. January 17, 1950. 27p. diagrs., photo., 2 tabs. (NACA RM L9J19)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEPT BACK  $35^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Robert F. Thompson. January 25, 1950. 22p. diagrs., tab. (NACA RM L9L12a)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.20 OF AN ALL-MOVABLE TRIANGULAR WING OF ASPECT RATIO 4 ALONE AND WITH A BODY. Louis S. Stivers, Jr. and Alexander W. Malick. February 2, 1950. 45p. diagrs., photos., tab. (NACA RM A9L01)

THE EFFECT OF ASPECT RATIO ON THE SUBSONIC AERODYNAMIC CHARACTERISTICS OF WINGS WITH NACA 651-210 SECTIONS. Warren H. Nelson and Albert L. Erickson. February 3, 1950. 31p. diagrs., photos., tab. (NACA RM A9K18)

MAXIMUM-LIFT INVESTIGATION AT MACH NUMBERS FROM 0.05 TO 1.20 OF A WING WITH LEADING EDGE SWEPT BACK  $42^\circ$ . Thomas R. Turner. February 14, 1950. 21p. diagrs. (NACA RM L9K03)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEPT BACK  $60^\circ$ , ASPECT RATIO 2, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and Thomas J. King, Jr. February 24, 1950. 31p. diagrs., photos., tab. (NACA RM L50A12)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEPT BACK  $60^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Raymond D. Vogler. March 2, 1950. 21p. diagrs. (NACA RM L50A17)

AERODYNAMIC CHARACTERISTICS OF A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 2, TAPER RATIO 0.78, AND NACA 65A004 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Edward C. Polhamus and George S. Campbell. March 8, 1950. 17p. diagrs., photos., tab. (NACA RM L50A18)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Alexander D. Hammond. March 10, 1950. 20p. diagrs. (NACA RM L50A03)

THE DAMPING IN ROLL OF ROCKET-POWERED TEST VEHICLES HAVING RECTANGULAR WINGS WITH NACA 65-006 AND SYMMETRICAL DOUBLE-WEDGE AIRFOIL SECTIONS OF ASPECT RATIO 4.5. Albert E. Dietz and James L. Edmondson. March 29, 1950. 12p. diagrs. (NACA RM L50B10)

INVESTIGATION AT HIGH SUBSONIC SPEEDS OF A  $45^\circ$  SWEPTBACK HORIZONTAL TAIL WITH PLAIN AND HORN-BALANCED CONTROL SURFACES. Harold S. Johnson and Robert F. Thompson. March 31, 1950. 44p. diagrs., photo., tab. (NACA RM L50B13)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEPT BACK  $45^\circ$ , ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A009 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth P. Spreemann, William D. Morrison, Jr. and Thomas B. Pasteur, Jr. April 6, 1950. 33p. diagrs., photos., tab. (NACA RM L50B03a)

MAXIMUM-LIFT INVESTIGATION OF A 1/40-SCALE X-1 AIRPLANE WING AT MACH NUMBERS FROM 0.60 TO 1.15. Thomas R. Turner. April 21, 1950. 18p. diagrs. (NACA RM L50C28)

FLIGHT INVESTIGATION OF THE EFFECT OF THICKENING THE AILERON TRAILING EDGE ON CONTROL EFFECTIVENESS FOR SWEPTBACK TAPERED WINGS HAVING SHARP- AND ROUND-NOSE SECTIONS. H. Kurt Strass and Edison M. Fields. May 2, 1950. 20p. diagrs., photo., tab. (NACA RM L9L19)

AERODYNAMIC CHARACTERISTICS WITH FIXED AND FREE TRANSITION OF A MODIFIED DELTA WING IN COMBINATION WITH A FUSELAGE AT HIGH SUBSONIC SPEEDS. Edward C. Polhamus and Thomas J. King, Jr. May 2, 1950. 19p. diagrs., photos. (NACA RM L50C21)

AERODYNAMIC AND LATERAL-CONTROL CHARACTERISTICS OF A 1/28-SCALE MODEL OF THE BELL X-1 AIRPLANE WING-FUSELAGE COMBINATION. TRANSONIC-BUMP METHOD. Vernard E. Lockwood. May 5, 1950. 28p. diagrs., tab. (NACA RM L50C22)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.25 OF A 6-PERCENT-THICK TRIANGULAR WING AND 6- AND 9-PERCENT-THICK TRIANGULAR WINGS IN COMBINATION WITH A FUSELAGE. WING ASPECT RATIO 2.31, BICONVEX AIRFOIL SECTIONS. Albert W. Hall and Garland J. Morris. May 5, 1950. 22p. diagrs., photo., 2 tabs. (NACA RM L50D05)



## Mach Number Effects - Complete Wings (Cont.)

AERODYNAMIC CHARACTERISTICS OF A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A004 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and James W. Wiggins. May 8, 1950. 31p. diagrs., photos., tab. (NACA RM L50C16)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE AND SPOILER-TYPE CONTROLS ON A WING WITH QUARTER-CHORD-LINE SWEEPBACK OF 60°, ASPECT RATIO 2, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Alexander D. Hammond. July 18, 1950. 26p. diagrs. (NACA RM L50E09)

INVESTIGATION AT HIGH SUBSONIC SPEEDS OF METHODS OF ALLEVIATING THE ADVERSE INTERFERENCE AT THE ROOT OF A SWEEPBACK WING. Lee E. Boddy. August 10, 1950. 31p. diagrs., photos. (NACA RM A50E26)

FLIGHT INVESTIGATION AT MACH NUMBERS FROM 0.6 TO 1.7 TO DETERMINE DRAG AND BASE PRESSURES ON A BLUNT-TRAILING-EDGE AIRFOIL AND DRAG OF DIAMOND AND CIRCULAR-ARC AIRFOILS AT ZERO LIFT. John D. Morrow and Ellis Katz. August 11, 1950. 25p. diagrs., photos. (NACA RM L50E19a)

MEASUREMENTS OF THE EFFECT OF TRAILING-EDGE THICKNESS ON THE ZERO-LIFT DRAG OF THIN LOW-ASPECT-RATIO WINGS. John D. Morrow. August 14, 1950. 12p. diagrs., photo. (NACA RM L50F26)

INVESTIGATION OF FLAP-TYPE AILERONS ON AN UNTAPERED WING HAVING AN ASPECT RATIO OF 3.7, 45° SWEEPBACK, AND AN NACA 65A009 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Richard G. MacLeod. August 23, 1950. 18p. diagrs. (NACA RM L50G03)

DAMPING IN ROLL OF RECTANGULAR WINGS OF SEVERAL ASPECT RATIOS AND NACA 65A-SERIES AIRFOIL SECTIONS OF SEVERAL THICKNESS RATIOS AT TRANSONIC AND SUPERSONIC SPEEDS AS DETERMINED WITH ROCKET-POWERED MODELS. James L. Edmondson. August 24, 1950. 16p. diagrs. (NACA RM L50E26)

WING-FLOW MEASUREMENTS OF LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A CANARD AIRPLANE CONFIGURATION WITH A 45° SWEEPBACK WING AND A TRIANGULAR ALL-MOVABLE CONTROL SURFACE. Harold L. Crane and James J. Adams. August 25, 1950. 53p. diagrs., photo. (NACA RM L50A31)

FLIGHT TESTS AT SUPERSONIC SPEEDS TO DETERMINE THE EFFECT OF TAPER ON THE ZERO-LIFT DRAG OF SWEEPBACK LOW-ASPECT-RATIO WINGS. Murray Pittel. September 5, 1950. 23p. diagrs., photos. (NACA RM L50F30a)

INVESTIGATION AT TRANSONIC SPEEDS OF A 35-PERCENT-CHORD AILERON ON A TAPERED WEDGE-TYPE WING OF ASPECT RATIO 2.5 WITH AND WITHOUT A FUSELAGE. Thomas R. Turner and Joseph E. Fikes. September 8, 1950. 25p. diagrs. (NACA RM L50G13a)

PRELIMINARY FLIGHT INVESTIGATION OF THE WING-DROPPING TENDENCY AND LATERAL-CONTROL CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AT TRANSONIC MACH NUMBERS. George A. Rathert, Jr., L. Stewart Rolls, Lee Winograd and George E. Cooper. September 11, 1950. 14p. diagrs., photo., tab. (NACA RM A50H03)

MEASUREMENTS OF AERODYNAMIC CHARACTERISTICS OF A 35° SWEEPBACK NACA 65-009 AIRFOIL MODEL WITH 1/4-CHORD FLAP HAVING A 31-PERCENT-FLAP-CHORD OVERHANG BALANCE BY THE NACA WING-FLOW METHOD. Harold I. Johnson and Harold R. Goodman. September 25, 1950. 38p. diagrs., photo. (NACA RM L50H09)

EFFECTS OF SWEEP ON THE MAXIMUM-LIFT CHARACTERISTICS OF FOUR ASPECT-RATIO-4 WINGS AT TRANSONIC SPEEDS. Thomas R. Turner. October 3, 1950. 25p. diagrs. (NACA RM L50H11)

PRELIMINARY FLIGHT INVESTIGATION OF THE DYNAMIC LONGITUDINAL-STABILITY CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE. William C. Triplett and Rudolph D. Van Dyke, Jr. December 11, 1950. 26p. diagrs., photo., tab. (NACA RM A50J09a)

INVESTIGATION OF THE DOWNWASH AND WAKE BEHIND A TRIANGULAR WING OF ASPECT RATIO 4 AT SUBSONIC AND SUPERSONIC MACH NUMBERS. Harold J. Walker and Louis S. Stivers, Jr. December 12, 1950. 32p. diagrs. (NACA RM A50I14a)

SUMMARY REPORT OF RESULTS OBTAINED DURING DEMONSTRATION TESTS OF THE NORTHROP X-4 AIRPLANES. Melvin Sadoff and Thomas R. Sisk. December 13, 1950. 46p. diagrs., photos., tab. (NACA RM A50I01)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.29 OF AN UNSWEPT TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS - TRAILING-EDGE FLAPS DEFLECTED. Louis S. Stivers, Jr. and Alexander W. Malick. December 13, 1950. 45p. diagrs., photo., 5 tabs. (NACA RM A50J09b)

EFFECTS OF SWEEP ON THE DAMPING-IN-ROLL CHARACTERISTICS OF THREE SWEEPBACK WINGS HAVING AN ASPECT RATIO OF 4 AT TRANSONIC SPEEDS. Vernard E. Lockwood. December 14, 1950. 23p. diagrs. (NACA RM L50J19)

TABULATED PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS MEASURED IN FLIGHT ON THE WING OF THE DOUGLAS D-558-I AIRPLANE FOR A 1 g STALL, A SPEED RUN TO A MACH NUMBER OF 0.90, AND A WIND-UP TURN AT A MACH NUMBER OF 0.86. Earl R. Keener and Mary Pierce. December 15, 1950. 40p. diagrs., photos., 5 tabs. (NACA RM L50J10)

EFFECT OF AN END PLATE ON THE AERODYNAMIC CHARACTERISTICS OF A 20.55° SWEEPBACK WING WITH AN ASPECT RATIO OF 2.67 AND A TAPER RATIO OF 0.5. TRANSONIC-BUMP METHOD. James M. Watson. December 21, 1950. 15p. diagrs., photo. (NACA RM L50H28a)

INVESTIGATION OF A 42.7° SWEEPBACK WING MODEL TO DETERMINE THE EFFECTS OF TRAILING-EDGE THICKNESS ON THE AILERON HINGE-MOMENT AND FLUTTER CHARACTERISTICS AT TRANSONIC SPEEDS. Robert F. Thompson. December 26, 1950. 42p. diagrs., photos., 2 tabs. (NACA RM L50J06)

TABULATED PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS MEASURED IN FLIGHT ON THE WING OF THE DOUGLAS D-558-I AIRPLANE THROUGHOUT THE NORMAL-FORCE-COEFFICIENT RANGE AT MACH NUMBERS OF 0.67, 0.74, 0.78, AND 0.82. Earl R. Keener, James R. Peele and Julia B. Woodbridge. January 29, 1951. 37p. diagrs., photos., 6 tabs. (NACA RM L50L12a)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A 60° DELTA WING EQUIPPED WITH A TRIANGULAR PLAN-FORM CONTROL HAVING A SKEWED HINGE AXIS AND AN OVERHANG BALANCE. TRANSONIC-BUMP METHOD. Harleth G. Wiley. February 6, 1951. 31p. diagrs. (NACA RM L50L01)



## Mach Number Effects - Complete Wings (Cont.)

THE EFFECTS OF MACH NUMBER AND REYNOLDS NUMBER ON THE AERODYNAMIC CHARACTERISTICS OF SEVERAL 12-PERCENT-THICK WINGS HAVING 35° OF SWEEPBACK AND VARIOUS AMOUNTS OF CAMBER. Bruce E. Tinling and W. Richard Kolk. February 23, 1951. 68p. diagrs., photo., tab. (NACA RM A50K27)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.29 OF AN UNSWEPT, TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS - LEADING-EDGE FLAPS DEFLECTED. Louis S. Stivers, Jr. and Alexander W. Malick. February 26, 1951. 37p. diagrs., photo., 5 tabs. (NACA RM A50K10)

EXPERIMENTAL DOWNWASH AND WAKE CHARACTERISTICS AT SUBSONIC AND SUPERSONIC MACH NUMBERS BEHIND AN UNSWEPT, TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS. Harold J. Walker, Louis S. Stivers, Jr. and Luther Beard, Jr. April 20, 1951. 43p. diagrs. (NACA RM A51B16)

FLIGHT MEASUREMENTS OF THE WING-DROPPING TENDENCY OF A STRAIGHT-WING JET AIRPLANE AT HIGH SUBSONIC MACH NUMBERS. Seth B. Anderson, Edward A. Ernst and Rudolph D. Van Dyke, Jr. April 24, 1951. 16p. diagrs., photo., tab. (NACA RM A51B28)

THE TRANSONIC CHARACTERISTICS OF 17 RECTANGULAR, SYMMETRICAL WING MODELS OF VARYING ASPECT RATIO AND THICKNESS. Warren H. Nelson and John B. McDevitt. May 10, 1951. 91p. diagrs., photos. (NACA RM A51A12)

PRESSURE-DISTRIBUTION MEASUREMENTS OVER A 45° SWEEPBACK WING AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. Edward C. B. Danforth and Thomas C. O'Bryan. June 1951. 42p. diagrs., photos. (NACA RM L51D24)

AERODYNAMIC CHARACTERISTICS OF TAPERED WINGS HAVING ASPECT RATIOS OF 4, 6, AND 8, QUARTER-CHORD LINES SWEEP BACK 45°, AND NACA 631A012 AIRFOIL SECTIONS. TRANSONIC-BUMP METHOD. Edward C. Polhamus and Thomas J. King, Jr. June 13, 1951. 23p. diagrs., photos., 2 tabs. (NACA RM L51C26)

AN EXPERIMENTAL STUDY AT MODERATE AND HIGH SUBSONIC SPEEDS OF THE FLOW OVER WINGS WITH 30° AND 45° OF SWEEPBACK IN CONJUNCTION WITH A FUSELAGE. Richard T. Whitcomb. June 15, 1951. 56p. diagrs., photos. (NACA RM L50K27)

AN EXPERIMENTAL STUDY OF MODERATE AND HIGH SUBSONIC SPEEDS OF THE FLOW OVER WINGS WITH 30° AND 45° OF SWEEPFORWARD IN CONJUNCTION WITH A FUSELAGE. Richard T. Whitcomb. June 15, 1951. 47p. diagrs., photo. (NACA RM L50K28)

AN EXPERIMENTAL STUDY OF MODERATE AND HIGH SUBSONIC SPEEDS OF THE FLOW OVER AN UNSWEPT WING IN CONJUNCTION WITH A FUSELAGE. Richard T. Whitcomb. June 18, 1951. 35p. diagrs., photos. (NACA RM L50L07)

EFFECTS OF SPANWISE THICKNESS VARIATION ON THE AERODYNAMIC CHARACTERISTICS OF 35° AND 45° SWEEPBACK WINGS OF ASPECT RATIO 6. TRANSONIC-BUMP METHOD. William D. Morrison, Jr. and Paul G. Fournier. July 1951. 38p. diagrs., photo. (NACA RM L51D19)

CONTRIBUTIONS OF WING, TAIL, AND FUSELAGE TO THE AERODYNAMIC CHARACTERISTICS OF A SEMISPAN MODEL OF A SUPERSONIC AIRPLANE CONFIGURATION AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Norman S. Silsby and James M. McKay. July 1951. 34p. diagrs., photos., tab. (NACA RM L51E01)

INVESTIGATION OF A TRIANGULAR WING IN CONJUNCTION WITH A FUSELAGE AND HORIZONTAL TAIL TO DETERMINE DOWNWASH AND LONGITUDINAL STABILITY CHARACTERISTICS - TRANSONIC BUMP METHOD. Edwin C. Allen. August 1951. 22p. diagrs., photos. (NACA RM A51F12a)

COMPARISON OF AIRFOIL SECTIONS ON TWO TRIANGULAR-WING-FUSELAGE CONFIGURATIONS AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Albert W. Hall and James M. McKay. August 1951. 23p. diagrs., photo., tab. (NACA RM L51F01)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP-TYPE CONTROL. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and Joseph E. Fikes. August 1951. 35p. diagrs. (NACA RM L51F06a)

SMALL-SCALE INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECTS OF THICKENING THE INBOARD SECTION OF A 45° SWEEPBACK WING OF ASPECT RATIO 4, TAPER RATIO 0.3, AND NACA 65A006 AIRFOIL SECTION. Kenneth P. Spreemann and William J. Alford, Jr. August 1951. 21p. diagrs., photo. (NACA RM L51F08a)

TABULATED PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS MEASURED IN FLIGHT ON THE WING OF THE D-558-I RESEARCH AIRPLANE THROUGH A MACH NUMBER RANGE OF 0.80 TO 0.89 AND THROUGHOUT THE NORMAL-FORCE-COEFFICIENT RANGE AT MACH NUMBERS OF 0.61, 0.70, 0.855, AND 0.88. Earl R. Keener and Rozalia M. Bandish. August 1951. 43p. diagrs., photos., 7 tabs. (NACA RM L51F12)

FLIGHT DETERMINATION OF THE EFFECTS OF WING VORTEX GENERATORS ON THE AERODYNAMIC CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE. De E. Beeler, Donald R. Bellman and John H. Griffith. August 14, 1951. 23p. diagrs., photos. tab. (NACA RM L51A23)

A METHOD FOR THE DESIGN OF SWEEPBACK WINGS WARPED TO PRODUCE SPECIFIED FLIGHT CHARACTERISTICS AT SUPERSONIC SPEEDS. Warren A. Tucker. September 1951. 52p. diagrs., 2 tabs. (NACA RM L51F08)

EFFECTS OF SPANWISE THICKNESS VARIATION ON THE TRANSONIC AERODYNAMIC CHARACTERISTICS OF WINGS HAVING 35° OF SWEEPBACK, ASPECT RATIO 4, AND TAPER RATIO 0.60. William D. Morrison, Jr. and Paul G. Fournier. September 1951. 21p. diagrs., photo. (NACA RM L51F28)

AN INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECTS OF CONTROL CHORD AND SPAN ON THE CONTROL CHARACTERISTICS OF A TAPERED WEDGE-TYPE WING OF ASPECT RATIO 2.5. TRANSONIC-BUMP METHOD. Raymond D. Vogler, Vernard E. Lockwood and Thomas R. Turner. September 1951. 36p. diagrs. (NACA RM L51G03)

A CORRELATION OF EXPERIMENTAL ZERO-LIFT DRAG OF RECTANGULAR WINGS WITH SYMMETRICAL NACA 65-SERIES AIRFOIL SECTIONS BY MEANS OF THE TRANSONIC SIMILARITY LAW FOR WINGS OF FINITE ASPECT RATIO. Edward C. B. Danforth. September 1951. 20p. diagrs. (NACA RM L51G20)



## Mach Number Effects - Complete Wings (Cont.)

THE EFFECTS ON THE AERODYNAMIC CHARACTERISTICS OF REVERSING THE WING OF A TRIANGULAR WING-BODY COMBINATION AT TRANSONIC SPEEDS AS DETERMINED BY THE NACA WING-FLOW METHOD. James M. McKay and Albert W. Hall. October 1951. 22p. diagrs., photo., 2 tabs. (NACA RM L51H23)

LOAD DISTRIBUTION OVER A FUSELAGE IN COMBINATION WITH A SWEEP WING AT SMALL ANGLES OF ATTACK AND TRANSONIC SPEEDS. Maurice D. White and Bonne C. Look. November 1951. 26p. diagrs., photo., tab. (NACA RM A51H15)

A FLIGHT EVALUATION OF THE LONGITUDINAL STABILITY CHARACTERISTICS ASSOCIATED WITH THE PITCH-UP OF A SWEEP-WING AIRPLANE IN MANEUVERING FLIGHT AT TRANSONIC SPEEDS. Seth B. Anderson and Richard S. Bray. November 1951. 33p. diagrs., photo., tab. (NACA RM A51I12)

INVESTIGATION OF WING-TIP AILERONS ON A 51.3° SWEEPBACK WING AT TRANSONIC SPEEDS BY THE TRANSONIC-BUMP METHOD. William C. Moseley, Jr. and James M. Watson. November 1951. 60p. diagrs. (NACA RM L51H27)

SUMMARY OF RESULTS OBTAINED BY TRANSONIC-BUMP METHOD ON EFFECTS OF PLAN FORM AND THICKNESS OF LIFT AND DRAG CHARACTERISTICS OF WINGS AT TRANSONIC SPEEDS. Edward C. Polhamus. November 1951. 33p. diagrs., tab. (NACA RM L51H30)

AERODYNAMIC CHARACTERISTICS OF A LEADING-EDGE SLAT ON A 35° SWEEP-BACK WING FOR MACH NUMBERS FROM 0.30 TO 0.88. John A. Kelly and Nora-Lee F. Hayter. December 1951. 49p. diagrs., tab. (NACA RM A51H23)

THE EFFECTS AT TRANSONIC SPEEDS OF THICKENING THE TRAILING EDGE OF A WING WITH A 4-PERCENT-THICK CIRCULAR-ARC AIRFOIL. Joseph W. Cleary and George L. Stevens. December 1951. 43p. diagrs., photo. (NACA RM A51J11)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A WING HAVING 45° SWEEP, ASPECT RATIO 8, TAPER RATIO 0.45, AND AIRFOIL SECTIONS VARYING FROM THE NACA 63A010 SECTION AT THE ROOT TO THE NACA 63A006 SECTION AT THE TIP. William D. Morrison, Jr. and Paul G. Fournier. January 1952. 22p. diagrs., photo. (NACA RM L51H28)

SMALL-SCALE INVESTIGATION OF THE EFFECTS OF TWIST AND CAMBER ON THE AERODYNAMIC CHARACTERISTICS OF A 60° 42' SWEEPBACK WING OF ASPECT RATIO 1.94. Kenneth P. Spreemann and William J. Alford, Jr. January 1952. 19p. diagrs., photo., tab. (NACA RM L51I21)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP TYPE OF CONTROL WITH OVERHANG BALANCE. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and John R. Hagerman. January 1952. 24p. diagrs. (NACA RM L51L11)

THE EFFECTIVENESS OF WING VORTEX GENERATORS IN IMPROVING THE MANEUVERING CHARACTERISTICS OF A SWEEP-WING AIRPLANE AT TRANSONIC SPEEDS. Norman M. McFadden, George A. Rathert, Jr. and Richard S. Bray. February 1952. 45p. photos., diagrs., tab. (NACA RM A51J18)

A CORRELATION BY MEANS OF THE TRANSONIC SIMILARITY RULES OF THE EXPERIMENTALLY DETERMINED CHARACTERISTICS OF 22 RECTANGULAR WINGS OF SYMMETRICAL PROFILE. John B. McDevitt. February 1952. 60p. diagrs., 3 tabs. (NACA RM A51L17b)

FLUTTER INVESTIGATION OF TWO THIN, LOW-ASPECT-RATIO, SWEEP, SOLID, METAL WINGS IN THE TRANSONIC RANGE BY USE OF A FREE-FALLING BODY. W. T. Lauten, Jr. and Maurice A. Sylvester. February 1952. 12p. diagrs., photo., 2 tabs. (NACA RM L51K28a)

WIND-TUNNEL INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF A THIN SWEEPBACK WING HAVING AN AIRFOIL SECTION DESIGNED FOR HIGH MAXIMUM LIFT. Stanley F. Racisz and Nicholas J. Paradiso. February 1952. 46p. diagrs., photo., tab. (NACA RM L51L04)

PRELIMINARY INVESTIGATION OF THE EFFECTS OF A PADDLE BALANCE ON THE CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45.58° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP-TYPE CONTROL. William C. Moseley, Jr. February 1952. 24p. diagrs., photo. (NACA RM L51L19)

HINGE-MOMENT AND OTHER AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A QUARTER-SPAN SPOILER ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Joseph E. Fikes. February 1952. 22p. diagrs., photo. (NACA RM L52A03)

PRELIMINARY INVESTIGATION OF CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A HORN-BALANCED FULL-SPAN CONTROL. John G. Lowry and Joseph E. Fikes. April 1952. 22p. diagrs., photo. (NACA RM L52A11)

PRELIMINARY INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECT OF BALANCING TABS ON THE HINGE-MOMENT AND OTHER AERODYNAMIC CHARACTERISTICS OF A FULL-SPAN FLAP ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. April 1952. 27p. diagrs., photo., (NACA RM L52A23)

THE EFFECTS ON THE AERODYNAMIC CHARACTERISTICS OF VARYING THE WING THICKNESS RATIO OF A TRIANGULAR WING-BODY CONFIGURATION AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Albert W. Hall and James M. McKay. April 1952. 27p. diagrs., photo., 2 tabs. (NACA RM L52B18)

INVESTIGATION OF LIFT AND CENTER OF PRESSURE OF LOW-ASPECT-RATIO, CRUCIFORM, TRIANGULAR, AND RECTANGULAR WINGS IN COMBINATION WITH A SLENDER FUSELAGE AT HIGH SUPERSONIC SPEEDS. Thomas N. Canning and Billy Pat Denardo. June 1952. 28p. diagrs., photos. (NACA RM A52C24)

AN INVESTIGATION OF LONGITUDINAL CONTROL CHARACTERISTICS OF A WING-TIP CONTROL SURFACE ON A SWEEPBACK WING AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. James P. Trant, Jr. June 1952. 23p. diagrs., photos., tab. (NACA RM L52B15a)

SMALL-SCALE TRANSONIC INVESTIGATION OF THE EFFECTS OF PARTIAL-SPAN LEADING-EDGE CAMBER ON THE AERODYNAMIC CHARACTERISTICS OF A 50° 38' SWEEPBACK WING OF ASPECT RATIO 2.98. William J. Alford, Jr. and Andrew L. Byrnes, Jr. June 1952. 28p. diagrs., photo., tab. (NACA RM L52D08a)



## Mach Number Effects - Complete Wings (Cont.)

THE TRANSONIC CHARACTERISTICS OF 38 CAMBERED RECTANGULAR WINGS OF VARYING ASPECT RATIO AND THICKNESS AS DETERMINED BY THE TRANSONIC-BUMP TECHNIQUE. Warren H. Nelson and Walter J. Krumm. July 1952. 173p. diags., photos. (NACA RM A52D11)

PRELIMINARY STUDY OF SOME FACTORS WHICH AFFECT THE STALL-FLUTTER CHARACTERISTICS OF THIN WINGS. A. Gerald Rainey. July 1952. 33p. diags., photo., tab. (NACA RM L52D08)

CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A LINKED FLAP AND SPOILER ON A TAPERED 45° SWEPTBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. July 1952. 24p. diags., photo. (NACA RM L52D25)

SMALL-SCALE TRANSONIC INVESTIGATION OF THE EFFECTS OF FULL-SPAN AND PARTIAL-SPAN LEADING-EDGE FLAPS ON THE AERODYNAMIC CHARACTERISTICS OF A 50° 38' SWEPTBACK WING OF ASPECT RATIO 2.98. Kenneth P. Spreemann and William J. Alford, Jr. July 1952. 31p. diags., photo. (NACA RM L52E12)

LATERAL-CONTROL INVESTIGATION AT TRANSONIC SPEEDS OF RETRACTABLE SPOILER AND PLUG-TYPE SPOILER-SLOTAILERONS ON A TAPERED 60° SWEPTBACK WING OF ASPECT RATIO 2. TRANSONIC-BUMP METHOD. Alexander D. Hammond and James M. Watson. August 1952. 19p. diags. (NACA RM L52F16)

HINGE-MOMENT AND CONTROL-EFFECTIVENESS CHARACTERISTICS OF AN OUTBOARD FLAP WITH AN OVERHANG NOSE BALANCE ON A TAPERED 35° SWEPTBACK WING OF ASPECT RATIO 4. TRANSONIC-BUMP METHOD. Robert F. Thompson and William C. Moseley, Jr. August 1952. 51p. diags. (NACA RM L52G08)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A 60° DELTA WING EQUIPPED WITH A CONSTANT-CHORD FLAP-TYPE CONTROL WITH AND WITHOUT AN UNSHIELDED HORN BALANCE. TRANSONIC-BUMP METHOD. Harleth G. Wiley and Leon Zontek. September 1952. 25p. diags. (NACA RM L51H22)

FLIGHT MEASUREMENTS OF THE LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A HIGH-SPEED FIGHTER AIRPLANE. H. L. Crane, A. R. Beckhardt and C. E. Matheny. September 1952. 50p. diags., tab. (NACA RM L52B14)

AN APPLICATION OF THE ROCKET-PROPELLED-MODEL TECHNIQUE TO THE INVESTIGATION OF LOW-LIFT BUFFETING AND THE RESULTS OF PRELIMINARY TESTS. Homer P. Mason and William N. Gardner. September 1952. 19p. diags., photos. (NACA RM L52C27)

FORCE TESTS OF THREE THIN WINGS OF MODERATELY LOW ASPECT RATIO AT HIGH SUBSONIC MACH NUMBERS. Gareth H. Jordan. October 1952. 22p. diags. (NACA RM L52I08)

AN ANALYSIS OF ESTIMATED AND EXPERIMENTAL TRANSONIC DOWNWASH CHARACTERISTICS AS AFFECTED BY PLAN FORM AND THICKNESS FOR WING AND WING-FUSELAGE CONFIGURATIONS. Joseph Weil, George S. Campbell and Margaret S. Diederich. November 1952. 92p. diags., 2 tabs. (NACA RM L52I22)

INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECT OF A POSITIVE-LIFT BALANCING TAB ON THE HINGE-MOMENT AND LIFT CHARACTERISTICS OF A FULL-SPAN FLAP ON A TAPERED 45° SWEPTBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. November 1952. 22p. diags., photo. (NACA RM L52J09)

CORRELATION OF BUFFET BOUNDARIES PREDICTED FROM WIND-TUNNEL TESTS WITH THOSE MEASURED DURING FLIGHT TESTS ON THE F8F-1 AND X-1 AIRPLANES - TRANSONIC-BUMP METHOD. Andrew Martin and James F. Reed. December 1952. 22p. diags., photos., tab. (NACA RM A52J17)

AERODYNAMIC CHARACTERISTICS OF TWO DELTA WINGS AT MACH NUMBER 4.04 AND CORRELATIONS OF LIFT AND MINIMUM-DRAG DATA FOR DELTA WINGS AT MACH NUMBERS FROM 1.62 TO 6.9. Edward F. Ulmann and Robert W. Dunning. December 1952. 20p. diags. (NACA RM L52K19)

ON THE APPLICATION OF TRANSONIC SIMILARITY RULES TO WINGS OF FINITE SPAN. John R. Spreiter. 1953. ii, 21p. diags. (NACA Rept. 1153. Formerly TN 2726)

EFFECTS OF ROUGHNESS AND REYNOLDS NUMBER ON THE NONLINEAR LIFT CHARACTERISTICS OF A WING WITH MODIFIED HEXAGONAL AIRFOIL SECTIONS. Milton A. Schwartzberg. February 1953. 18p. diags., photo. (NACA RM L52L26a)

INVESTIGATION OF THREE TAPERED 45° SWEPTBACK CAMBERED AND TWISTED WINGS COVERING A SIMULTANEOUS VARIATION IN ASPECT RATIO AND THICKNESS RATIO AND OF ONE RELATED SYMMETRICAL WING AT TRANSONIC SPEEDS BY THE WING-FLOW METHOD. Harold I. Johnson. March 1953. 55p. diags., photos., 2 tabs. (NACA RM L52H07)

MEASUREMENTS OF AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF AN UNSWEPT AND UNTAPERED NACA 65-009 AIRFOIL MODEL OF ASPECT RATIO 3 WITH 1/4-CHORD PLAIN FLAP BY THE NACA WING-FLOW METHOD. Harold I. Johnson. June 1953. 35p. diags., photo. (NACA RM L53D21)

EFFECTS OF RATE OF FLAP DEFLECTION ON FLAP HINGE MOMENT AND WING LIFT THROUGH THE MACH NUMBER RANGE FROM 0.32 TO 0.87. Thomas R. Turner. June 1953. 29p. diags., photos. (NACA RM L53E11)

SOME OBSERVATIONS ON STALL FLUTTER AND BUFFETING. A. Gerald Rainey. June 1953. 11p. diags. (NACA RM L53E15)

INVESTIGATION AT TRANSONIC SPEEDS OF THE HINGE-MOMENT AND LIFT-EFFECTIVENESS CHARACTERISTICS OF A SINGLE FLAP AND A TANDEM FLAP ON A 60° DELTA WING. Delwin R. Croom and Harleth G. Wiley. July 1953. 16p. diags. (NACA RM L53E28a)

A CORRELATION BY MEANS OF TRANSONIC SIMILARITY RULES OF THE EXPERIMENTALLY DETERMINED CHARACTERISTICS OF 18 CAMBERED WINGS OF RECTANGULAR PLAN FORM. John B. McDevitt. September 1953. 57p. diags. (NACA RM A53G31)

THE AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF AN ALL-MOVABLE, TAPERED, 45° SWEPTBACK, ASPECT-RATIO-4 TAIL DEFLECTED ABOUT A SKEWED HINGE AXIS AND EQUIPPED WITH AN INSET UNBALANCING TAB. James M. Watson. September 1953. 40p. diags. (NACA RM L53H13)



## Mach Number Effects - Complete Wings (Cont.)

AN INVESTIGATION OF THE USE OF ROCKET-POWERED MODELS FOR GUST-LOAD STUDIES WITH AN APPLICATION TO A TAILLESS SWEEP-WING MODEL AT TRANSONIC SPEEDS. A. James Vitale, H. Press and C. C. Shufflebarger. June 1954. 36p. diagrs., photos., tab. (NACA TN 3161)

LIFT AND PITCHING MOMENT AT SUPERSONIC SPEEDS DUE TO CONSTANT VERTICAL ACCELERATION FOR THIN SWEEPBACK TAPERED WINGS WITH STREAMWISE TIPS. SUPERSONIC LEADING AND TRAILING EDGES. Isabella J. Cole and Kenneth Margolis. July 1954. 67p. diagrs., 4 tabs. (NACA TN 3196)

A PRELIMINARY FLIGHT INVESTIGATION OF AN OIL-FLOW TECHNIQUE FOR AIR-FLOW VISUALIZATION. Harold I. Johnson and Robert G. Mungall. October 1954. 33p. diagrs., photos. (NACA RM L54G14a)

COMPARISON OF FLUTTER CALCULATIONS USING VARIOUS AERODYNAMIC COEFFICIENTS WITH EXPERIMENTAL RESULTS FOR SOME RECTANGULAR CANTILEVER WINGS AT MACH NUMBER 1.3. Herbert C. Nelson and Ruby A. Rainey. November 1954. 22p. diagrs., 2 tabs. (NACA TN 3301)

A SIMPLIFIED METHOD FOR CALCULATING AEROELASTIC EFFECTS ON THE ROLL OF AIRCRAFT. John M. Hedgepeth, Paul G. Waner, Jr. and Robert J. Kell. March 1955. 26p. diagrs., 4 tabs. (NACA TN 3370)

TOTAL LIFT AND PITCHING MOMENT ON THIN ARROWHEAD WINGS OSCILLATING IN SUPERSONIC POTENTIAL FLOW. H. J. Cunningham. May 1955. 43p. diagrs., 4 tabs. (NACA TN 3433)

## WAKE (1.2.2.7)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. LONGITUDINAL STABILITY AND CONTROL OF THE D-558-1. John B. Wright. July 8, 1948. 47p. diagrs., tab. (NACA RM L8C23)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE - DYNAMIC PRESSURE AND COMPARISON OF POINT AND EFFECTIVE DOWNWASH AT THE TAIL OF THE D-558-1. Harold L. Robinson. November 4, 1948. 27p. diagrs. (NACA RM L8H05)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $45^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Joseph Weil and Kenneth W. Goodson. February 24, 1949. 28p. diagrs., photo., tab. (NACA RM L9A21)

INVESTIGATION OF DOWNWASH AND WAKE CHARACTERISTICS AT A MACH NUMBER OF 1.53. I - RECTANGULAR WING. Edward W. Perkins and Thomas N. Canning. March 1, 1949. 29p. diagrs. (NACA RM A8L16)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $35^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and Robert E. Becht. April 21, 1949. 29p. diagrs., photo., tab. (NACA RM L9B25)

INVESTIGATION OF DOWNWASH AND WAKE CHARACTERISTICS AT A MACH NUMBER OF 1.53. II - TRIANGULAR WING. Edward W. Perkins and Thomas N. Canning. June 6, 1949. 31p. diagrs. (NACA RM A9D20)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $45^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.3, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and Thomas J. King, Jr. July 20, 1949. 28p. diagrs., photo., tab. (NACA RM L9E25)

AERODYNAMIC CHARACTERISTICS OF A DELTA WING WITH LEADING EDGE SWEEP BACK  $45^\circ$ , ASPECT RATIO 4, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and Robert E. Becht. September 6, 1949. 29p. diagrs., photo., tab. (NACA RM L9G22a)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $60^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Thomas J. King, Jr. and Boyd C. Myers, II. September 6, 1949. 32p. diagrs., photos., tab. (NACA RM L9G27)

AERODYNAMIC CHARACTERISTICS OF A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth W. Goodson and William D. Morrison, Jr. October 21, 1949. 32p. diagrs., photos., tab. (NACA RM L9H22)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $45^\circ$ , ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth W. Goodson and Albert G. Few, Jr. November 1, 1949. 34p. diagrs., photos., tab. (NACA RM L9I08)

DOWNWASH IN VORTEX REGION BEHIND TRAPEZOIDAL-WING TIP AT MACH NUMBER 1.91. J. L. Cummings, H. Mirels and L. E. Baughman. November 10, 1949. 39p. diagrs., photos. (NACA RM E9H15)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $35^\circ$ , ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and William D. Morrison, Jr. December 12, 1949. 32p. diagrs., photos., tab. (NACA RM L9K10a)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $60^\circ$ , ASPECT RATIO 2, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and Thomas J. King, Jr. February 24, 1950. 31p. diagrs., photos., tab. (NACA RM L50A12)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $45^\circ$ , ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A009 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth P. Spreemann, William D. Morrison, Jr. and Thomas B. Pasteur, Jr. April 6, 1950. 33p. diagrs., photos., tab. (NACA RM L50B03a)



## Wake - Complete Wings (Cont.)

AERODYNAMIC CHARACTERISTICS OF A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A004 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and James W. Wiggins. May 8, 1950. 31p. diagrs., photos., tab. (NACA RM L50C16)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LONGITUDINAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. September 8, 1950. 80p. diagrs., photos., 2 tabs. (NACA RM A50G06)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS AT HIGH-SUBSONIC SPEEDS OF TWO MODELS OF A TRANSONIC RESEARCH AIRPLANE WITH WINGS AND HORIZONTAL TAILS OF ASPECT RATIOS 4.2 AND 2. Arvo A. Luoma and John B. Wright. September 29, 1950. 134p. diagrs., photos., 3 tabs. (NACA RM L50H07)

DOWNWASH IN VORTEX REGION BEHIND RECTANGULAR HALF-WING AT MACH NUMBER 1.91. John L. Cummings and Rudolph C. Haefeli. October 26, 1950. 43p. diagrs., photos., tab. (NACA RM E50H10)

INVESTIGATION OF THE DOWNWASH AND WAKE BEHIND A TRIANGULAR WING OF ASPECT RATIO 4 AT SUBSONIC AND SUPERSONIC MACH NUMBERS. Harold J. Walker and Louis S. Stivers, Jr. December 12, 1950. 32p. diagrs. (NACA RM A50I14a)

EXPERIMENTAL DOWNWASH AND WAKE CHARACTERISTICS AT SUBSONIC AND SUPERSONIC MACH NUMBERS BEHIND AN UNSWEPT, TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS. Harold J. Walker, Louis S. Stivers, Jr. and Luther Beard, Jr. April 20, 1951. 43p. diagrs. (NACA RM A51B16)

AN EXPERIMENTAL STUDY AT MODERATE AND HIGH SUBSONIC SPEEDS OF THE FLOW OVER WINGS WITH 30° AND 45° OF SWEEPBACK IN CONJUNCTION WITH A FUSELAGE. Richard T. Whitcomb. June 15, 1951. 56p. diagrs., photos. (NACA RM L50K27)

AN EXPERIMENTAL STUDY OF MODERATE AND HIGH SUBSONIC SPEEDS OF THE FLOW OVER WINGS WITH 30° AND 45° OF SWEEPFORWARD IN CONJUNCTION WITH A FUSELAGE. Richard T. Whitcomb. June 15, 1951. 47p. diagrs., photo. (NACA RM L50K28)

AN EXPERIMENTAL STUDY OF MODERATE AND HIGH SUBSONIC SPEEDS OF THE FLOW OVER AN UNSWEPT WING IN CONJUNCTION WITH A FUSELAGE. Richard T. Whitcomb. June 18, 1951. 35p. diagrs., photos. (NACA RM L50L07)

INVESTIGATION OF A TRIANGULAR WING IN CONJUNCTION WITH A FUSELAGE AND HORIZONTAL TAIL TO DETERMINE DOWNWASH AND LONGITUDINAL STABILITY CHARACTERISTICS - TRANSONIC BUMP METHOD. Edwin C. Allen. August 1951. 22p. diagrs., photos. (NACA RM A51F12a)

EFFECTS OF HORIZONTAL-TAIL POSITION, AREA, AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 60° TRIANGULAR-WING MODEL HAVING VARIOUS TRIANGULAR-ALL-MOVABLE HORIZONTAL TAILS. Byron M. Jaquet. December 1951. 61p. diagrs., photo., tab. (NACA RM L51I06)

EFFECTS OF HORIZONTAL-TAIL POSITION AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 60° TRIANGULAR-WING MODEL HAVING TWIN TRIANGULAR ALL-MOVABLE TAILS. Byron M. Jaquet. May 1952. 45p. diagrs., photos. (NACA RM L52B25)

A STUDY OF THE FLOW FIELD BEHIND THE TRIANGULAR HORIZONTAL TAIL OF A CANARD AIRPLANE AT APPROXIMATELY THE VERTICAL-TAIL LOCATION BY MEANS OF A TUFT GRID. Joseph L. Johnson, Jr. October 1952. 18p. diagrs., tab. (NACA RM L52H11)

AN ANALYSIS OF ESTIMATED AND EXPERIMENTAL TRANSONIC DOWNWASH CHARACTERISTICS AS AFFECTED BY PLAN FORM AND THICKNESS FOR WING AND WING-FUSELAGE CONFIGURATIONS. Joseph Weil, George S. Campbell and Margaret S. Diederich. November 1952. 92p. diagrs., 2 tabs. (NACA RM L52I22)

CORRELATION OF BUFFET BOUNDARIES PREDICTED FROM WIND-TUNNEL TESTS WITH THOSE MEASURED DURING FLIGHT TESTS ON THE F8F-1 AND X-1 AIRPLANES - TRANSONIC-BUMP METHOD. Andrew Martin and James F. Reed. December 1952. 22p. diagrs., photos., tab. (NACA RM A52J17)

APPLICATION OF TWO-DIMENSIONAL VORTEX THEORY TO THE PREDICTION OF FLOW FIELDS BEHIND WINGS OF WING-BODY COMBINATIONS AT SUBSONIC AND SUPERSONIC SPEEDS. Arthur Wm. Rogers. September 1954. (ii), 91p. diagrs., photo., 3 tabs. (NACA TN 3227)

PRELIMINARY RESULTS FROM FLOW-FIELD MEASUREMENTS AROUND SINGLE AND TANDEM ROTORS IN THE LANGLEY FULL-SCALE TUNNEL. Harry H. Heyson. November 1954. 19p. diagrs., photos. (NACA TN 3242)

PREDICTION OF DOWNWASH BEHIND SWEEPED-WING AIRPLANES AT SUBSONIC SPEED. John DeYoung and Walter H. Barling, Jr. January 1955. 104p. diagrs., 3 tabs. (NACA TN 3346)

FLIGHT MEASUREMENTS OF THE VELOCITY DISTRIBUTION AND PERSISTENCE OF THE TRAILING VORTICES OF AN AIRPLANE. Christopher C. Kraft, Jr. March 1955. 32p. diagrs., photos., tab. (NACA TN 3377)

ON SLENDER DELTA WINGS WITH LEADING-EDGE SEPARATION. Clinton E. Brown and William H. Michael, Jr. April 1955. 27p. diagrs. (NACA TN 3430)

## BOUNDARY LAYER (1.2.2.8)

WIND-TUNNEL INVESTIGATION OF A WING-FUSELAGE COMBINATION WITH EXTERNAL STORES. H. Norman Silvers and Kenneth P. Spremann. July 9, 1948. 55p. diagrs. (NACA RM L7K20)

INVESTIGATIONS AT SUPERSONIC SPEEDS OF 22 TRIANGULAR WINGS REPRESENTING TWO AIRFOIL SECTIONS FOR EACH OF 11 APEX ANGLES. Eugene S. Love. May 10, 1949. 100p. diagrs., photos., 3 tabs. (NACA RM L9D07)

INVESTIGATION AT MACH NUMBER 1.62 OF THE PRESSURE DISTRIBUTION OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 25, 1950. 81p. diagrs., photos. (NACA RM L9J05)



AERODYNAMICS  
48 WINGS (1.2)

Characteristics

(1.2.2.8.1)

A PRELIMINARY FLIGHT INVESTIGATION OF AN OIL-FLOW TECHNIQUE FOR AIR-FLOW VISUALIZATION. Harold I. Johnson and Robert G. Mungall. October 1954. 33p. diagsr., photos. (NACA RM L54G14a)

Control

(1.2.2.8.2)

FLIGHT DETERMINATION OF THE EFFECTS OF WING VORTEX GENERATORS ON THE AERODYNAMIC CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE. De E. Beeler, Donald R. Bellman and John H. Griffith. August 14, 1951. 23p. diagsr., photos., tab. (NACA RM L51A23)

EXPERIMENTAL INVESTIGATION OF AIR-FLOW UNIFORMITY AND PRESSURE LEVEL ON WIRE CLOTH FOR TRANSPIRATION-COOLING APPLICATIONS. Patrick L. Donoughe and Roy A. McKinnon. July 1952. 28p. diagsr., photos., tab. (NACA RM E52E16)

A FIBROUS-GLASS COMPACT AS A PERMEABLE MATERIAL FOR BOUNDARY-LAYER-CONTROL APPLICATIONS USING AREA SUCTION. Robert E. Dannenberg, James A. Weiberg and Bruno J. Gambucci. January 1955. 20p. diagsr., photos., 2 tabs. (NACA TN 3388)



## Bodies (1.3)

AN EMPIRICAL CRITERION FOR FIN STABILIZING JETTISONABLE NOSE SECTIONS OF AIRPLANES. Stanley H. Scher. December 8, 1949. 21p. diagrs., photo., tab. (NACA RM L9I28)

THE PATH AND MOTION OF SCALE MODELS OF JETTISONABLE NOSE SECTIONS AT SUPERSONIC SPEEDS AS DETERMINED FROM AN INVESTIGATION IN THE LANGLEY FREE-FLIGHT APPARATUS. Lawrence J. Gale. May 23, 1950. 35p. diagrs., photos., 2 tabs. (NACA RM L9J13a)

MOTION OF A TRANSONIC AIRPLANE NOSE SECTION WHEN JETTISONED AS DETERMINED FROM WIND-TUNNEL INVESTIGATIONS ON A 1/25-SCALE MODEL. Stanley H. Scher and Lawrence J. Gale. May 26, 1950. 64p. diagrs., photos., tab. (NACA RM L9L08a)

THE CALCULATION OF THE PATH OF A JETTISONABLE NOSE SECTION. Roscoe H. Goodwin. September 7, 1950. 35p. diagrs. (NACA RM L50G18)

ESTIMATED DECELERATION OF AIRPLANE NOSE SECTION JETTISONED AT VARIOUS ALTITUDES AND AIRSPEEDS. Stanley H. Scher. January 8, 1951. 39p. diagrs. (NACA RM L50K09)

THE EFFECT OF BLUNTNES ON THE DRAG OF SPHERICAL-TIPPED TRUNCATED CONES OF FINENESS RATIO 3 AT MACH NUMBERS 1.2 TO 7.4. Simon C. Sommer and James A. Stark. April 1952. 18p. photos., diagrs. (NACA RM A52B13)

PRESSURE DISTRIBUTIONS ON BODIES OF REVOLUTION AT SUBSONIC AND TRANSONIC SPEEDS. Richard I. Cole. July 1952. 47p. diagrs., photos., tab. (NACA RM L52D30)

INVESTIGATION OF THE VARIATION WITH REYNOLDS NUMBER OF THE BASE, WAVE, AND SKIN-FRICTION DRAG OF A PARABOLIC BODY OF REVOLUTION (NACA RM-10) AT MACH NUMBERS OF 1.62, 1.93, AND 2.41 IN THE LANGLEY 9-INCH SUPERSONIC TUNNEL. Eugene S. Love, Donald E. Coletti and August F. Bromm, Jr. October 1952. 62p. diagrs., photos., (NACA RM L52H21)

WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF VARIOUS DORSAL-FIN AND VERTICAL-TAIL CONFIGURATIONS ON THE DIRECTIONAL STABILITY OF A STREAMLINED BODY OF TRANSONIC SPEEDS. TRANSONIC-BUMP METHOD. Harold S. Johnson and William C. Hayes. April 1953. 22p. diagrs., photo., tab. (NACA RM L53B19)

THE ZERO-LIFT DRAG OF A SLENDER BODY OF REVOLUTION (NACA RM-10 RESEARCH MODEL) AS DETERMINED FROM TESTS IN SEVERAL WIND TUNNELS AND IN FLIGHT AT SUPERSONIC SPEEDS. Albert J. Evans. 1954. ii, 13p. diagrs., tab. (NACA Rept. 1160. Formerly TN 2944)

SOME NEW DRAG DATA ON THE NACA RM-10 MISSILE AND A CORRELATION OF THE EXISTING DRAG MEASUREMENTS AT  $M = 1.6$  AND  $3.0$ . Robert J. Carros and Carlton S. James. June 1954. 24p. diagrs., photos., tab. (NACA TN 3171)

TRANSONIC FLOW PAST CONE CYLINDERS. George E. Solomon, California Institute of Technology. September 1954. 56p. diagrs., photos. (NACA TN 3213)

AN EXPERIMENTAL INVESTIGATION OF THE BASE PRESSURE CHARACTERISTICS OF NON-LIFTING BODIES OF REVOLUTION AT MACH NUMBERS FROM 2.73 TO 4.98. John O. Reller, Jr. and Frank M. Hamaker. March 1955. 45p. diagrs., photos. (NACA TN 3393. Formerly RM A52E20)

## THEORY (1.3.1)

ERROR IN AIRSPEED MEASUREMENT DUE TO STATIC-PRESSURE FIELD AHEAD OF SHARP-NOSE BODIES OF REVOLUTION AT TRANSONIC SPEEDS. Edward C. B. Danforth and J. Ford Johnston. August 19, 1949. 31p. diagrs., photos. (NACA RM L9C25)

MEASUREMENTS OF THE DRAG AND PRESSURE DISTRIBUTION ON A BODY OF REVOLUTION THROUGHOUT TRANSITION FROM SUBSONIC TO SUPERSONIC SPEEDS. Jim Rogers Thompson. January 16, 1950. 36p. diagrs., photos., 2 tabs. (NACA RM L9J27)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LONGITUDINAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. September 8, 1950. 80p. diagrs., photos., 2 tabs. (NACA RM A50G06)

AVERAGE SKIN-FRICTION COEFFICIENTS FROM BOUNDARY-LAYER MEASUREMENTS IN FLIGHT ON A PARABOLIC BODY OF REVOLUTION (NACA RM-10) AT SUPERSONIC SPEEDS AND AT LARGE REYNOLDS NUMBERS. Charles B. Rumsey and J. Dan Loposer. March 7, 1951. 33p. diagrs., photo. (NACA RM L51B12)

A SEMIEMPIRICAL METHOD FOR CALCULATING THE PITCHING MOMENT OF BODIES OF REVOLUTION AT LOW MACH NUMBERS. Edward J. Hopkins. May 17, 1951. 27p. diagrs., tab. (NACA RM A51C14)

AN EXPERIMENTAL INVESTIGATION AT SUBSONIC SPEEDS OF A SCOOP-TYPE AIR-INDUCTION SYSTEM FOR A SUPERSONIC AIRPLANE. Curt A. Holzhauser. July 1951. 45p. diagrs., photos. (NACA RM A51E24)



## Theory - Bodies (Cont.)

A SUMMARY OF AVAILABLE KNOWLEDGE CONCERNING SKIN FRICTION AND HEAT TRANSFER AND ITS APPLICATION TO THE DESIGN OF HIGH-SPEED MISSILES. Morris W. Rubesin, Charles B. Rumsey and Steven A. Varga. November 1951. 17p. diags. (NACA RM A51J25a)

BODIES OF REVOLUTION FOR MINIMUM DRAG AT HIGH SUPERSONIC AIRSPEEDS. A. J. Eggers, Jr., David H. Dennis and Meyer M. Resnikoff. February 1952. 44p. diags., photos. (NACA RM A51K27)

PRELIMINARY INVESTIGATION OF THE DRAG CHARACTERISTICS OF THE NACA RM-10 MISSILE AT MACH NUMBERS OF 1.40 AND 1.59 IN THE LANGLEY 4- BY 4-FOOT SUPERSONIC TUNNEL. Lowell E. Hasel, Archibald R. Sinclair and Clyde V. Hamilton, April 1952. 49p. diags., photos, 3 tabs. (NACA RM L52A14)

SUPPLEMENTARY NOTE ON MODIFIED-IMPACT-THEORY CALCULATIONS FOR BODIES OF REVOLUTION HAVING MINIMUM DRAG AT HYPERSONIC SPEEDS. Meyer M. Resnikoff. July 1952. 13p. diagr. (NACA RM A52D24)

PRESSURE DISTRIBUTIONS ON BODIES OF REVOLUTION AT SUBSONIC AND TRANSONIC SPEEDS. Richard I. Cole. July 1952. 47p. diags., photos., tab. (NACA RM L52D30)

A VECTOR STUDY OF LINEARIZED SUPERSONIC FLOW APPLICATIONS TO NONPLANAR PROBLEMS. John C. Martin. 1953. ii, 34p. diags., tab. (NACA Rept. 1143. Formerly TN 2641)

A NEW HODOGRAPH FOR FREE-STREAMLINE THEORY. Anatol Roshko, California Institute of Technology. July 1954. 39p. diags., 3 tabs. (NACA TN 3168)

ON THE DRAG AND SHEDDING FREQUENCY OF TWO-DIMENSIONAL BLUFF BODIES. Anatol Roshko, California Institute of Technology. July 1954. 29p. diags., tab. (NACA TN 3169)

THEORETICAL INVESTIGATION AT SUBSONIC SPEEDS OF THE FLOW AHEAD OF A SLENDER INCLINED PARABOLIC-ARC BODY OF REVOLUTION AND CORRELATION WITH EXPERIMENTAL DATA OBTAINED AT LOW SPEEDS. William Letko and Edward C. B. Danforth, III. July 1954. 56p. diags. (NACA TN 3205)

ON THE DETERMINATION OF CERTAIN BASIC TYPES OF SUPERSONIC FLOW FIELDS. (Sulla determinazione di alcuni tipi di campi di corrente ipersonora). Carlo Ferrari. November 1954. 17p. diags. (NACA TM 1381. Trans. from Rendiconti della R. Accademie Nazionale dei Lincei, Series 8, v. 7, no. 6, Dec. 1949)

SUBSONIC EDGES IN THIN-WING AND SLENDER-BODY THEORY. Milton D. Van Dyke. November 1954. 26p. diags. (NACA TN 3343)

ARRANGEMENT OF FUSIFORM BODIES TO REDUCE THE WAVE DRAG AT SUPERSONIC SPEEDS. Morris D. Friedman and Doris Cohen. November 1954. 23p. diags. (NACA TN 3345. Formerly RM A51I20)

GENERAL THEORY OF CONICAL FLOWS AND ITS APPLICATION TO SUPERSONIC AERODYNAMICS. (La theorie generale des mouvements coniques et ses applications a l'aerodynamique supersonique). Paul Germain. PREFACE. M. J. Peres. January 1955. vii, 333p. diags. (NACA TM 1354. Trans. from Office National d'Etudes et de Recherches Aéronautiques, Pub. 34, 1949)

MINIMUM-DRAG BODIES OF REVOLUTION IN A NONUNIFORM SUPERSONIC FLOW FIELD. Conrad Rennemann, Jr. February 1955. 25p. diags. (NACA TN 3369)

AXIALLY SYMMETRIC SHAPES WITH MINIMUM WAVE DRAG. Max A. Heaslet and Franklyn B. Fuller. February 1955. 46p. diags. (NACA TN 3389)

APPLICATION OF THE GENERALIZED SHOCK-EXPANSION METHOD TO INCLINED BODIES OF REVOLUTION TRAVELING AT HIGH SUPERSONIC AIRSPEEDS. Raymond C. Savin. April 1955. 71p. diags., photos., tab. (NACA TN 3349)

## SHAPE VARIABLES (1.3.2)

THE EFFECT OF REAR CHINE STRIPS ON THE TAKE-OFF CHARACTERISTICS OF A HIGH-SPEED AIRPLANE FITTED WITH NACA HYDRO-SKIS. John A. Ramsen. March 17, 1949. 7p. diags., photo. (NACA RM L9B10a)

PRELIMINARY WIND-TUNNEL INVESTIGATION AT HIGH-SUBSONIC SPEEDS OF PLANING-TAIL, BLENDED, AND AIRFOIL-FOREBODY SWEPT HULLS. John M. Riebe and Richard G. MacLeod. September 12, 1949. 33p. diags., photos., 3 tabs. (NACA RM L9D01)

EXPERIMENTAL INVESTIGATION OF SUPERSONIC FLOW WITH DETACHED SHOCK WAVES FOR MACH NUMBERS BETWEEN 1.8 AND 2.9. W. E. Moeckel. July 5, 1950. 56p. diags., photos., 4 tabs. (NACA RM E50D05)

STATIC DIRECTIONAL STABILITY OF A TANDEM-HELICOPTER FUSELAGE. Charles C. Smith, Jr. August 9, 1950. 23p. diags., photo. (NACA RM L50F29)

FLIGHT INVESTIGATION AT MACH NUMBERS FROM 0.8 TO 1.5 TO DETERMINE THE EFFECTS OF NOSE BLUNTNESS ON THE TOTAL DRAG OF TWO FIN-STABILIZED BODIES OF REVOLUTION. Roger G. Hart. October 16, 1950. 12p. diags., photos., 2 tabs. (NACA RM L50I08a)

RESULTS OF FLIGHT TESTS TO DETERMINE DRAG OF PARABOLIC AND CONE-CYLINDER BODIES OF VERY LARGE FINENESS RATIOS AT SUPERSONIC SPEEDS. Clement J. Welsh and Carlos A. deMoraes. August 1951. 17p. diags., photos. (NACA RM L51E18)

PRESSURE DISTRIBUTIONS ON BODIES OF REVOLUTION AT SUBSONIC AND TRANSONIC SPEEDS. Richard I. Cole. July 1952. 47p. diags., photos., tab. (NACA RM L52D30)



## Shape Variables - Bodies (Cont.)

AVERAGE SKIN-FRICTION COEFFICIENTS FROM BOUNDARY-LAYER MEASUREMENTS ON A OGIVE-CYLINDER BODY IN FLIGHT AT SUPERSONIC SPEEDS. J. Dan Loposer. January 1953. 11p. diags., photo. (NACA RM L52K28a)

REDUCTION OF HELICOPTER PARASITE DRAG. Robert D. Harrington. August 1954. 8p. diags. (NACA TN 3234)

EXPERIMENTAL DETERMINATION OF BOUNDARY-LAYER TRANSITION ON A BODY OF REVOLUTION AT  $M = 3.5$ . James R. Jedlicka, Max E. Wilkins and Alvin Seiff. October 1954. 56p. diags., photos. (NACA TN 3342. Formerly RM A53L18)

MINIMUM-DRAG BODIES OF REVOLUTION IN A NONUNIFORM SUPERSONIC FLOW FIELD. Conrad Rennemann, Jr. February 1955. 25p. diags. (NACA TN 3369)

APPLICATION OF THE GENERALIZED SHOCK-EXPANSION METHOD TO INCLINED BODIES OF REVOLUTION TRAVELING AT HIGH SUPERSONIC AIRSPEEDS. Raymond C. Savin. April 1955. 71p. diags., photos., tab. (NACA TN 3349)

FLIGHT MEASUREMENTS OF BASE PRESSURE ON BODIES OF REVOLUTION WITH AND WITHOUT SIMULATED ROCKET CHAMBERS. Robert F. Peck. April 1955. 18p. diags., photo. (NACA TN 3372. Formerly RM L50I28a)

## FINENESS RATIO (1. 3. 2. 1)

FLIGHT TESTS TO DETERMINE THE DRAG OF FIN-STABILIZED PARABOLIC BODIES AT TRANSONIC AND SUPERSONIC SPEEDS. Sidney R. Alexander, Leo T. Chauvin and Charles B. Rumsey. April 21, 1948. 24p. diags., photos. (NACA RM L8A05)

DRAG MEASUREMENTS AT TRANSONIC SPEEDS OF TWO BODIES OF FINENESS RATIO 9 WITH DIFFERENT LOCATIONS OF MAXIMUM BODY DIAMETER. Jim Rogers Thompson and Max C. Kurbjun. July 22, 1948. 17p. diags., photos. (NACA RM L8A28b)

EFFECT OF WING SWEEP, TAPER, AND THICKNESS RATIO ON THE TRANSONIC DRAG CHARACTERISTICS OF WING-BODY COMBINATIONS. Jim Rogers Thompson and Charles W. Matthews. December 31, 1948. 29p. diags., photos., 2 tabs. (NACA RM L8K01)

ERROR IN AIRSPEED MEASUREMENT DUE TO STATIC-PRESSURE FIELD AHEAD OF SHARP-NOSE BODIES OF REVOLUTION AT TRANSONIC SPEEDS. Edward C. B. Danforth and J. Ford Johnston. August 19, 1949. 31p. diags., photos. (NACA RM L9C25)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.25 OF A 6-PERCENT-THICK TRIANGULAR WING AND 6- AND 9-PERCENT-THICK TRIANGULAR WINGS IN COMBINATION WITH A FUSELAGE. WING ASPECT RATIO 2.31, BICONVEX AIRFOIL SECTIONS. Albert W. Hall and Garland J. Morris. May 5, 1950. 22p. diags., photo., 2 tabs. (NACA RM L50D05)

INVESTIGATION AT TRANSONIC SPEEDS OF A 35-PERCENT-CHORD AILERON ON A TAPERED WEDGE-TYPE WING OF ASPECT RATIO 2.5 WITH AND WITHOUT A FUSELAGE. Thomas R. Turner and Joseph E. Fikes. September 8, 1950. 25p. diags. (NACA RM L50G13a)

APPARATUS FOR OBTAINING A SUPERSONIC FLOW OF VERY SHORT DURATION AND SOME DRAG MEASUREMENTS OBTAINED WITH ITS USE. John E. Yeates, Jr., F. J. Bailey, Jr. and T. J. Voglewede. July 23, 1951. 23p. diags., photos. (NACA RM L9C01)

WING-FLOW STUDY OF PRESSURE-DRAG REDUCTION AT TRANSONIC SPEED BY PROJECTING A JET OF AIR FROM THE NOSE OF A PROLATE SPHEROID OF FINENESS RATIO 6. Mitchell Lopatoff. October 1951. 20p. photos., diags., tab. (NACA RM L51E09)

BASE PRESSURES MEASURED ON SEVERAL PARABOLIC-ARC BODIES OF REVOLUTION IN FREE FLIGHT AT MACH NUMBERS FROM 0.8 TO 1.4 AND AT LARGE REYNOLDS NUMBERS. Ellis Katz and William E. Stoney, Jr. October 1951. 20p. diags., photos. (NACA RM L51F29)

PRESSURE DISTRIBUTIONS ON BODIES OF REVOLUTION AT SUBSONIC AND TRANSONIC SPEEDS. Richard I. Cole. July 1952. 47p. diags., photos., tab. (NACA RM L52D30)

AERODYNAMIC CHARACTERISTICS OF A REFINED DEEP-STEP PLANING-TAIL FLYING-BOAT HULL WITH VARIOUS FOREBODY AND AFTERBODY SHAPES. John M. Riebe and Rodger L. Naeseth. 1953. ii, 19p. diags., photos., 8 tabs. (NACA Rept. 1144. Formerly TN 2489; RM L8F01)

A COMPARISON OF THE EXPERIMENTAL SUBSONIC PRESSURE DISTRIBUTIONS ABOUT SEVERAL BODIES OF REVOLUTION WITH PRESSURE DISTRIBUTIONS COMPUTED BY MEANS OF THE LINEARIZED THEORY. Clarence W. Matthews. 1953. ii, 29p. diags., tab. (NACA Rept. 1155. Formerly TN 2519; RM L9F28)

GENERAL THEORY OF CONICAL FLOWS AND ITS APPLICATION TO SUPERSONIC AERODYNAMICS. (La théorie générale des mouvements coniques et ses applications à l'aérodynamique supersonique). Paul Germain. PREFACE. M. J. Peres. January 1955. vii, 333p. diags. (NACA TM 1354. Trans. from Office National d'Études et de Recherches Aéronautiques, Pub. 34, 1949)

STATIC STABILITY OF FUSELAGES HAVING A RELATIVELY FLAT CROSS SECTION. William R. Bates. March 1955. 29p. diags., tab. (NACA TN 3429. Formerly RM L9I06a)



CROSS SECTION  
(1. 3. 2. 2)

DAMPING IN YAW AND STATIC DIRECTIONAL STABILITY OF A CANARD AIRPLANE MODEL AND OF SEVERAL MODELS HAVING FUSELAGES OF RELATIVELY FLAT CROSS SECTION. Joseph L. Johnson. October 16, 1950. 20p. diagrs., tab. (NACA RM L50H30a)

FREE-FLIGHT-TUNNEL INVESTIGATION OF THE LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A MODEL HAVING A FUSELAGE OR RELATIVELY FLAT CROSS SECTION. John W. Paulson and Joseph L. Johnson, Jr. February 1953. 30p. diagrs., photo., tab. (NACA RM L52L22)

STATIC STABILITY OF FUSELAGES HAVING A RELATIVELY FLAT CROSS SECTION. William R. Bates. March 1955. 29p. diagrs., tab. (NACA TN 3429. Formerly RM L9I06a)

THICKNESS DISTRIBUTION  
(1. 3. 2. 3)

DRAG MEASUREMENTS AT TRANSONIC SPEEDS OF TWO BODIES OF FINENESS RATIO 9 WITH DIFFERENT LOCATIONS OF MAXIMUM BODY DIAMETER. Jim Rogers Thompson and Max C. Kurbjun. July 22, 1948. 17p. diagrs., photos. (NACA RM L8A28b)

STUDY BY NACA WING-FLOW METHOD OF TRANSONIC DRAG CHARACTERISTICS OF A BLUNT-NOSE BODY OF REVOLUTION AND COMPARISON WITH RESULTS FOR A SHARP-NOSE BODY. J. Ford Johnston and Mitchell Lopatoff. April 26, 1949. 26p. diagrs., photos. (NACA RM L9C11)

MEASUREMENTS OF THE DRAG AND PRESSURE DISTRIBUTION ON A BODY OF REVOLUTION THROUGHOUT TRANSITION FROM SUBSONIC TO SUPERSONIC SPEEDS. Jim Rogers Thompson. January 16, 1950. 36p. diagrs., photos., 2 tabs. (NACA RM L9J27)

FLIGHT INVESTIGATION AT MACH NUMBERS FROM 0.8 TO 1.5 TO DETERMINE THE EFFECTS OF NOSE BLUNTNESS ON THE TOTAL DRAG OF TWO FIN-STABILIZED BODIES OF REVOLUTION. Roger G. Hart. October 16, 1950. 12p. diagrs., photos., 2 tabs. (NACA RM L50I08a)

BASE PRESSURES MEASURED ON SEVERAL PARABOLIC-ARC BODIES OF REVOLUTION IN FREE FLIGHT AT MACH NUMBERS FROM 0.8 TO 1.4 AND AT LARGE REYNOLDS NUMBERS. Ellis Katz and William E. Stoney, Jr. October 1951. 20p. diagrs., photos. (NACA RM L51F29)

AN EXPLORATORY INVESTIGATION OF SKIN FRICTION AND TRANSITION ON THREE BODIES OF REVOLUTION AT A MACH NUMBER OF 1.61. John H. Hilton, Jr. and K. R. Czarnecki. June 1954. 15p. diagrs. (NACA TN 3193)

SURFACE CONDITIONS  
(1. 3. 2. 4)

WING-FLOW STUDY OF PRESSURE-DRAG REDUCTION AT TRANSONIC SPEED BY PROJECTING A JET OF AIR FROM THE NOSE OF A PROLATE SPHEROID OF FINENESS RATIO 6. Mitchell Lopatoff. October 1951. 20p. photos., diagrs., tab. (NACA RM L51E09)

FLIGHT MEASUREMENTS OF THE EFFECTS OF SURFACE CONDITION ON THE SUPERSONIC DRAG OF FIN-STABILIZED PARABOLIC BODIES OF REVOLUTION. H. Herbert Jackson. May 1952. 17p. diagrs., photos. (NACA RM L52B26)

INVESTIGATION OF THE VARIATION WITH REYNOLDS NUMBER OF THE BASE, WAVE, AND SKIN-FRICTION DRAG OF A PARABOLIC BODY OF REVOLUTION (NACA RM-10) AT MACH NUMBERS OF 1.62, 1.93, AND 2.41 IN THE LANGLEY 9-INCH SUPERSONIC TUNNEL. Eugene S. Love, Donald E. Coletti and August F. Bromm, Jr. October 1952. 62p. diagrs., photos., (NACA RM L52H21)

INVESTIGATION OF DISTRIBUTED SURFACE ROUGHNESS ON A BODY OF REVOLUTION AT A MACH NUMBER OF 1.61. K. R. Czarnecki, Ross B. Robinson and John H. Hilton, Jr. June 1954. 35p. diagrs., photo., 2 tabs. (NACA TN 3230)

EXPERIMENTAL DETERMINATION OF BOUNDARY-LAYER TRANSITION ON A BODY OF REVOLUTION AT  $M = 3.5$ . James R. Jedlicka, Max E. Wilkins and Alvin Seiff. October 1954. 56p. diagrs., photos. (NACA TN 3342. Formerly RM A53L18)

BOUNDARY-LAYER TRANSITION AT MACH 3.12 WITH AND WITHOUT SINGLE ROUGHNESS ELEMENTS. Paul F. Brinich. December 1954. 41p. diagrs. (NACA TN 3267)

PROTUBERANCES  
(1. 3. 2. 5)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LONGITUDINAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. September 8, 1950. 80p. diagrs., photos., 2 tabs. (NACA RM A50G06)

DRAG INVESTIGATION OF SOME FIN CONFIGURATIONS FOR BOOSTER ROCKETS AT MACH NUMBERS BETWEEN 0.5 AND 1.4. John C. McFall, Jr. November 21, 1950. 17p. diagrs., photos., tab. (NACA RM L50J12)

FLIGHT MEASUREMENTS OF THE EFFECTS OF SURFACE CONDITION ON THE SUPERSONIC DRAG OF FIN-STABILIZED PARABOLIC BODIES OF REVOLUTION. H. Herbert Jackson. May 1952. 17p. diagrs., photos. (NACA RM L52B26)

REDUCTION OF HELICOPTER PARASITE DRAG. Robert D. Harrington. August 1954. 8p. diagrs. (NACA TN 3234)



## Protuberances - Shape Variables (Cont.)

BOUNDARY-LAYER TRANSITION AT MACH 3.12 WITH AND WITHOUT SINGLE ROUGHNESS ELEMENTS. Paul F. Brinich. December 1954. 41p. diagrs. (NACA TN 3267)

EXPERIMENTS ON TURBULENT FLOW THROUGH CHANNELS HAVING POROUS ROUGH SURFACES WITH OR WITHOUT AIR INJECTION. E. R. G. Eckert, Anthony J. Diaguila and Patrick L. Donoughe. February 1955. 45p. diagrs., photos., tab. (NACA TN 3339)

AN INVESTIGATION OF DRAINS DISCHARGING LIQUID INTO SUBSONIC AND TRANSONIC STREAMS. Allen R. Vick and Frank V. Silhan. March 1955. 54p. diagrs., photos., tab. (NACA TN 3359)

## CANOPIES (1.3.3)

WIND-TUNNEL INVESTIGATION AT A MACH NUMBER OF 1.53 OF AN AIRPLANE WITH A TRIANGULAR WING. Richard Scherrer and William R. Wimbrow. January 23, 1948. 74p. diagrs., photos., 2 tabs. (NACA RM A7J05)

STATIC STABILITY OF FUSELAGES HAVING A RELATIVELY FLAT CROSS SECTION. William R. Bates. March 1955. 29p. diagrs., tab. (NACA TN 3429. Formerly RM L9I06a)

## DUCTED BODIES (1.3.4)

WIND-TUNNEL INVESTIGATION AT A MACH NUMBER OF 1.53 OF AN AIRPLANE WITH A TRIANGULAR WING. Richard Scherrer and William R. Wimbrow. January 23, 1948. 74p. diagrs., photos., 2 tabs. (NACA RM A7J05)

EXPERIMENTAL INVESTIGATION OF SUPERSONIC FLOW WITH DETACHED SHOCK WAVES FOR MACH NUMBERS BETWEEN 1.8 AND 2.9. W. E. Moeckel. July 5, 1950. 56p. diagrs., photos., 4 tabs. (NACA RM E50D05)

FLIGHT DETERMINATION OF THE DRAG AND PRESSURE RECOVERY OF AN NACA 1-40-250 NOSE INLET AT MACH NUMBERS FROM 0.9 TO 1.8. R. I. Sears and C. F. Merlet. February 28, 1951. 32p. diagrs., photos., 2 tabs. (NACA RM L50L18)

AN INVESTIGATION OF SEVERAL NACA 1-SERIES NOSE INLETS WITH AND WITHOUT PROTRUDING CENTRAL BODIES AT HIGH-SUBSONIC MACH NUMBERS AND AT A MACH NUMBER OF 1.2. Robert E. Pendley and Harold L. Robinson. May 1955. 51p. diagrs., photos. (NACA TN 3436. Formerly RM L9L23a)

## NOSE SHAPE (1.3.4.1)

AN INVESTIGATION OF THREE TRANSONIC FUSE-LAGE AIR INLETS AT MACH NUMBERS FROM 0.4 TO 0.94 AND AT A MACH NUMBER OF 1.19. Robert E. Pendley, Harold L. Robinson and Claude V. Williams. November 7, 1950. 51p. diagrs., photos., 3 tabs. (NACA RM L50H24)

THE EXTERNAL-SHOCK DRAG OF SUPERSONIC INLETS HAVING SUBSONIC ENTRANCE FLOW. Louis M. Nucci. December 20, 1950. 28p. diagrs., photos. (NACA RM L50G14a)

THE ORIGIN OF AERODYNAMIC INSTABILITY OF SUPERSONIC INLETS AT SUBCRITICAL CONDITIONS. Antonio Ferri and Louis M. Nucci. January 26, 1951. 111p. diagrs., photos., tab. (NACA RM L50K30)

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LOW-SPEED INVESTIGATION OF THE EFFECTS OF ANGLE OF ATTACK ON THE PRESSURE RECOVERY OF A CIRCULAR NOSE INLET WITH SEVERAL LIP SHAPES. James R. Blackaby. May 1955. 30p. diagrs., photo. (NACA TN 3394)

## SIDE INLETS (1.3.4.3)

PRESSURE RECOVERY AT SUPERSONIC SPEEDS THROUGH ANNULAR DUCT INLETS SITUATED IN A REGION OF APPRECIABLE BOUNDARY LAYER. I - ADDITION OF ENERGY TO THE BOUNDARY LAYER. Wallace F. Davis and George B. Brajnikoff. April 1, 1948. 22p. diagrs., photos. (NACA RM A8A13)

AN EXPERIMENTAL INVESTIGATION OF NACA SUBMERGED INLETS AT HIGH SUBSONIC SPEEDS. I - INLETS FORWARD OF THE WING LEADING EDGE. Charles F. Hall and F. Dorn Barclay. June 9, 1948. 64p. diagrs., photos. (NACA RM A8B16)

TANK SPRAY TESTS OF A JET-POWERED MODEL FITTED WITH NACA HYDRO-SKIS. Kenneth L. Wadlin and John A. Ramsen. July 22, 1948. 19p. diagrs., photos. (NACA RM L8B18)

PRESSURE RECOVERY AT SUPERSONIC SPEEDS THROUGH ANNULAR DUCT INLETS SITUATED IN A REGION OF APPRECIABLE BOUNDARY LAYER. II - EFFECT OF AN OBLIQUE SHOCK WAVE IMMEDIATELY AHEAD OF THE INLET. George B. Brajnikoff. August 9, 1948. 15p. diagrs., photos. (NACA RM A8F08)

RAM-RECOVERY CHARACTERISTICS OF NACA SUBMERGED INLETS AT HIGH SUBSONIC SPEEDS. Charles F. Hall and Joseph L. Frank. November 17, 1948. 44p. diagrs., photos. (NACA RM A8I29)

THE EFFECT OF THE PROPELLER SLIPSTREAM ON THE CHARACTERISTICS OF SUBMERGED INLETS. Noel K. Delany. September 9, 1949. 41p. diagrs., photos. (NACA RM A9G15)



### Side Inlets - Ducted Bodies (Cont.)

A COMPARISON OF TWO SUBMERGED INLETS AT SUBSONIC AND TRANSONIC SPEEDS. Emmet A. Mossman. September 15, 1949. 31p. diagrs., photos. (NACA RM A9F16)

TESTS OF A SMALL-SCALE NACA SUBMERGED INLET AT TRANSONIC MACH NUMBERS. L. Stewart Rolls and George A. Rathert, Jr. February 23, 1950. 18p. diagrs., photos. (NACA RM A9L29)

AN INVESTIGATION OF THREE TRANSONIC FUSE-LAGE AIR INLETS AT MACH NUMBERS FROM 0.4 TO 0.94 AND AT A MACH NUMBER OF 1.19. Robert E. Pendley, Harold L. Robinson and Claude V. Williams. November 7, 1950. 51p. diagrs., photos., 3 tabs. (NACA RM L50H24)

LOW-SPEED INVESTIGATION OF A SEMISUBMERGED AIR SCOOP WITH AND WITHOUT BOUNDARY-LAYER SUCTION. P. Kenneth Pierpont and Robert R. Howell. February 23, 1951. 46p. diagrs., photos., 2 tabs. (NACA RM L50H15)

AN EXPERIMENTAL INVESTIGATION AT SUBSONIC SPEEDS OF A SCOOP-TYPE AIR-INDUCTION SYSTEM FOR A SUPERSONIC AIRPLANE. Curt A. Holzhauser. July 1951. 45p. diagrs., photos. (NACA RM A51E24)

COMPARISON OF DRAG, PRESSURE RECOVERY AND SURFACE PRESSURE OF A SCOOP-TYPE INLET AND AN NACA SUBMERGED INLET AT TRANSONIC SPEEDS. Joseph L. Frank and Robert A. Taylor. December 1951. 63p. diagrs., photos. (NACA RM A51H20a)

THE EFFECT OF ENTRANCE MACH NUMBER AND LIP SHAPE ON THE SUBSONIC CHARACTERISTICS OF A SCOOP-TYPE AIR-INDUCTION SYSTEM FOR A SUPERSONIC AIRPLANE. Curt A. Holzhauser. January 1952. 39p. diagrs., photos., tab. (NACA RM A51J19a)

SOME EFFECTS OF SIDE-WALL MODIFICATIONS ON THE DRAG AND PRESSURE RECOVERY OF AN NACA SUBMERGED INLET AT TRANSONIC SPEEDS. Robert A. Taylor. February 1952. 25p. diagrs., photos. (NACA RM A51L03a)

PRELIMINARY INVESTIGATION OF A SUBMERGED AIR SCOOP UTILIZING BOUNDARY-LAYER SUCTION TO OBTAIN INCREASED PRESSURE RECOVERY. Mark R. Nichols and P. Kenneth Pierpont. April 1955. 72p. diagrs., photos., 2 tabs. (NACA TN 3437. Formerly RM L50A13)

### SIDE EXITS (1.3.4.4)

A TRANSONIC INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF PLATE- AND BELL-TYPE OUTLETS FOR AUXILIARY AIR. William J. Nelson and Paul E. Dewey. September 1952. 25p. diagrs., photos. (NACA RM L52H20)

A PRELIMINARY INVESTIGATION OF AERODYNAMIC CHARACTERISTICS OF SMALL INCLINED AIR OUTLETS AT TRANSONIC MACH NUMBERS. Paul E. Dewey. May 1955. 21p. diagrs., photos. (NACA TN 3442. Formerly RM L53C10)

### HULLS (1.3.5)

PRELIMINARY WIND-TUNNEL INVESTIGATION AT HIGH-SUBSONIC SPEEDS OF PLANING-TAIL, BLENDED, AND AIRFOIL-FOREBODY SWEEP HULLS. John M. Riebe and Richard G. MacLeod. September 12, 1949. 33p. diagrs., photos., 3 tabs. (NACA RM L9D01)

AERODYNAMIC CHARACTERISTICS OF A REFINED DEEP-STEP PLANING-TAIL FLYING-BOAT HULL WITH VARIOUS FOREBODY AND AFTERBODY SHAPES. John M. Riebe and Rodger L. Naeseth. 1953. ii, 19p. diagrs., photos., 8 tabs. (NACA Rept. 1144. Formerly TN 2489; RM L8F01)



## Internal Aerodynamics (1.4)

EXPERIMENTAL INVESTIGATION OF TYPICAL CONSTANT- AND VARIABLE-AREA EXHAUST NOZZLES AND EFFECTS ON AXIAL-FLOW TURBOJET-ENGINE PERFORMANCE. Lewis E. Wallner and John T. Wintler. July 1951. 43p. diags., photos. (NACA RM E51D19)

INVESTIGATION OF POWER EXTRACTION CHARACTERISTICS AND BRAKING REQUIREMENTS OF A WINDMILLING TURBOJET ENGINE. Curtis L. Walker and David B. Fenn. July 1952. 31p. diags., tab. (NACA RM E52D30)

INVESTIGATION TO DETERMINE EFFECTS OF RECTANGULAR VORTEX GENERATORS ON THE STATIC-PRESSURE DROP THROUGH A 90° CIRCULAR ELBOW. E. Floyd Valentine and Martin R. Copp. September 1953. 35p. diags., photos. (NACA RM L53G08)

CONVECTION OF A PATTERN OF VORTICITY THROUGH A SHOCK WAVE. H. S. Ribner. 1954. ii, 17p. diags. (NACA Rept. 1164. Formerly TN 2864)

UNSTEADY OBLIQUE INTERACTION OF A SHOCK WAVE WITH A PLANE DISTURBANCE. Franklin K. Moore. 1954. ii, 21p. diags. (NACA Rept. 1165. Formerly TN 2879)

A NOTE ON SECONDARY FLOW IN ROTATING RADIAL CHANNELS. James J. Kramer and John D. Stanitz. 1954. ii, 12p. diags. (NACA Rept. 1179. Formerly TN 3013)

REDUCTION OF HELICOPTER PARASITE DRAG. Robert D. Harrington. August 1954. 8p. diags. (NACA TN 3234)

INVESTIGATION OF SHOCK DIFFUSERS AT MACH NUMBER 1.85. III - MULTIPLE-SHOCK AND CURVED-CONTOUR PROJECTING CONES. W. E. Moeckel and J. F. Connors. August 13, 1947. 23p. diags., photos. (NACA RM E7F13)

### AIR INLETS (1.4.1)

FLIGHT DETERMINATION OF THE DRAG AND PRESSURE RECOVERY OF AN NACA 1-40-250 NOSE INLET AT MACH NUMBERS FROM 0.9 TO 1.8. R. I. Sears and C. F. Merlet. February 28, 1951. 32p. diags., photos., 2 tabs. (NACA RM L50L18)

METHOD AND GRAPHS FOR THE EVALUATION OF AIR-INDUCTION SYSTEMS. George B. Brajnikoff. 1953. ii, 22p. diags., tab. (NACA Rept. 1141. Formerly TN 2697)

A METHOD FOR EVALUATING THE EFFECTS OF DRAG AND INLET PRESSURE RECOVERY ON PROPULSION-SYSTEM PERFORMANCE. Emil J. Kremzier. August 1954. 21p. diags. (NACA TN 3261)

INGESTION OF FOREIGN OBJECTS INTO TURBINE ENGINES BY VORTICES. Lewis A. Rodert and Floyd B. Garrett. February 1955. 23p. diags., photos. (NACA TN 3330)

### NOSE, CENTRAL (1.4.1.1)

STUDY BY NACA WING-FLOW METHOD OF TRANSONIC DRAG CHARACTERISTICS OF A BLUNT-NOSE BODY OF REVOLUTION AND COMPARISON WITH RESULTS FOR A SHARP-NOSE BODY. J. Ford Johnston and Mitchell Lopatoff. April 26, 1949. 26p. diags., photos. (NACA RM L9C11)

SUPERSONIC TUNNEL INVESTIGATION BY MEANS OF INCLINED-PLATE TECHNIQUE TO DETERMINE PERFORMANCE OF SEVERAL NOSE INLETS OVER MACH NUMBER RANGE OF 1.72 TO 2.18. Jerome L. Fox. February 14, 1951. 27p. diags., photos. (NACA RM E50K14)

PRESSURE DISTRIBUTION AT LOW SPEED ON A 1/4-SCALE BELL X-5 AIRPLANE MODEL. William B. Kemp, Jr. and Albert G. Few, Jr. December 1951. 86p. diags., photos. (NACA RM L51I25)

AMPLITUDE OF SUPERSONIC DIFFUSER FLOW PULSATIONS. William H. Sterbentz and Joseph Davids. December 1952. 23p. diags. (NACA RM E52I24)

AN INVESTIGATION OF SEVERAL NACA 1-SERIES NOSE INLETS WITH AND WITHOUT PROTRUDING CENTRAL BODIES AT HIGH-SUBSONIC MACH NUMBERS AND AT A MACH NUMBER OF 1.2. Robert E. Pendley and Harold L. Robinson. May 1955. 51p. diags., photos. (NACA TN 3436. Formerly RM L9L23a)

### Propeller-Spinner-Cowl Combinations (1.4.1.1.1)

SUBSONIC MACH AND REYNOLDS NUMBER EFFECTS ON THE SURFACE PRESSURES, GAP FLOW, PRESSURE RECOVERY, AND DRAG OF A NONROTATING NACA 1-SERIES E-TYPE COWLING AT AN ANGLE OF ATTACK OF 0°. Robert M. Reynolds and Robert I. Sammonds. July 1951. 73p. diags., photo., 3 tabs. (NACA RM A51E03)

EFFECTS OF PROPELLER-SHANK GEOMETRY AND PROPELLER-SPINNER-JUNCTURE CONFIGURATION ON CHARACTERISTICS OF AN NACA 1-SERIES COWLING-SPINNER COMBINATION WITH AN EIGHT-BLADE DUAL-ROTATION PROPELLER. Arvid L. Keith, Jr., Gene J. Bingham and Arnold J. Rubin. September 1951. 73p. diags., photos., 5 tabs. (NACA RM L51F26)

EFFECTS OF PROPELLER-SPINNER JUNCTURE ON THE PRESSURE-RECOVERY CHARACTERISTICS OF AN NACA 1-SERIES D-TYPE COWL IN COMBINATION WITH A FOUR-BLADE SINGLE-ROTATION PROPELLER AT MACH NUMBERS UP TO 0.83 AND AT AN ANGLE OF ATTACK OF 0°. Robert I. Sammonds and Ashley J. Molk. June 1952. 45p. diags., photos., tab. (NACA RM A52D01a)



Propeller-Spinner-Cowl  
Combinations (Cont.)

EFFECTS OF COMPRESSIBILITY AT MACH NUMBERS UP TO 0.8 ON INTERNAL-FLOW CHARACTERISTICS OF A COWLING-SPINNER COMBINATION EQUIPPED WITH AN EIGHT-BLADE DUAL-ROTATION PROPELLER. Gene J. Bingham and Arvid L. Keith, Jr. June 1953. 39p. diags., photos. (NACA RM L53E12)

Subsonic  
(1. 4. 1. 1. 2)

SUBSONIC MACH AND REYNOLDS NUMBER EFFECTS ON THE SURFACE PRESSURES, GAP FLOW, PRESSURE RECOVERY, AND DRAG OF A NONROTATING NACA 1-SERIES E-TYPE COWLING AT AN ANGLE OF ATTACK OF  $0^\circ$ . Robert M. Reynolds and Robert I. Sammonds. July 1951. 73p. diags., photo., 3 tabs. (NACA RM A51E03)

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Supersonic  
(1. 4. 1. 1. 3)

AN EXPERIMENTAL INVESTIGATION AT SUPERSONIC SPEEDS OF ANNULAR DUCT INLETS SITUATED IN A REGION OF APPRECIABLE BOUNDARY LAYER. Wallace F. Davis, George B. Brajnikoff, David L. Goldstein and Joseph M. Spiegel. September 24, 1947. 41p. diags., photos. (NACA RM A7G15)

INVESTIGATION OF PERFORATED CONVERGENT-DIVERGENT DIFFUSERS WITH INITIAL BOUNDARY LAYER. Maynard I. Weinstein. August 15, 1950. 26p. diags., photo. (NACA RM E50F12)

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INVESTIGATION OF THREE TYPES OF SUPERSONIC DIFFUSER OVER A RANGE OF MACH NUMBERS FROM 1.75 TO 2.74. L. Eugene Baughman and Lawrence I. Gould. March 12, 1951. 37p. diags., photos. (NACA RM E50L08)

AN ANALYSIS OF BUZZING IN SUPERSONIC RAM JETS BY A MODIFIED ONE-DIMENSIONAL NON-STATIONARY WAVE THEORY. Robert L. Trimpi. March 1952. 72p. diags., photos. (NACA RM L52A18)

A THEORY FOR STABILITY AND BUZZ PULSATION AMPLITUDE IN RAM JETS AND AN EXPERIMENTAL INVESTIGATION INCLUDING SCALE EFFECTS. Robert L. Trimpi. October 1953. 75p. diags., photos., 3 tabs. (NACA RM L53G28)

NOSE, ANNULAR  
(1. 4. 1. 2)

INVESTIGATION OF SHOCK DIFFUSERS AT MACH NUMBER 1.85. III - MULTIPLE-SHOCK AND CURVED-CONTOUR PROJECTING CONES. W. E. Moeckel and J. F. Connors. August 13, 1947. 23p. diags., photos. (NACA RM L53G13)

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## WING LEADING EDGE

### (1.4.1.3)

LOW-SPEED WIND-TUNNEL INVESTIGATION OF A TRIANGULAR SWEPTBACK AIR INLET IN THE ROOT OF A 45° SWEPTBACK WING. Arvid L. Keith, Jr. and Jack Schiff. January 1955. 65p. diags., photos., 5 tabs. (NACA TN 3363. Formerly RM L50101)

## SIDE

### (1.4.1.4)

AN INVESTIGATION OF THREE TRANSONIC FUSE-LAGE AIR INLETS AT MACH NUMBERS FROM 0.4 TO 0.94 AND AT A MACH NUMBER OF 1.19. Robert E. Pendley, Harold L. Robinson and Claude V. Williams. November 7, 1950. 51p. diags., photos., 3 tabs. (NACA RM L50H24)

INVESTIGATION OF AN NACA SUBMERGED INLET AT MACH NUMBERS FROM 1.17 to 1.99. Warren E. Anderson and Alson C. Frazer. September 1952. 29p. diags., photo. (NACA RM A52F17)

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## Scoops

### (1.4.1.4.1)

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## Submerged

### (1.4.1.4.2)

AN EXPERIMENTAL INVESTIGATION OF NACA SUBMERGED INLETS AT HIGH SUBSONIC SPEEDS. I - INLETS FORWARD OF THE WING LEADING EDGE. Charles F. Hall and F. Dorn Barclay. June 9, 1948. 64p. diags., photos. (NACA RM A8B16)

AN EXPERIMENTAL INVESTIGATION AT LARGE SCALE OF SEVERAL CONFIGURATIONS OF AN NACA SUBMERGED AIR INTAKE. Norman J. Martin and Curt A. Holzhauser. October 19, 1948. 68p. diags., photos., 7 tabs. (NACA RM A8F21)

RAM-RECOVERY CHARACTERISTICS OF NACA SUBMERGED INLETS AT HIGH SUBSONIC SPEEDS. Charles F. Hall and Joseph L. Frank. November 17, 1948. 44p. diags., photos. (NACA RM A8I29)

AN EXPERIMENTAL INVESTIGATION AT LARGE SCALE OF SINGLE AND TWIN NACA SUBMERGED SIDE INTAKES AT SEVERAL ANGLES OF SIDESLIP. Norman J. Martin and Curt A. Holzhauser. August 1, 1949. 31p. diags., photo. (NACA RM A9F20)

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Submerged - Air Inlets (Cont.)

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DUCTS  
(1.4.2)

INVESTIGATION TO DETERMINE EFFECTS OF RECTANGULAR VORTEX GENERATORS ON THE STATIC-PRESSURE DROP THROUGH A 90° CIRCULAR ELBOW. E. Floyd Valentine and Martin R. Copp. September 1953. 35p. diagrs., photos. (NACA RM L53G08)

TRANSVERSE OSCILLATIONS IN A CYLINDRICAL COMBUSTION CHAMBER. Franklin K. Moore and Stephen H. Maslen. October 1954. 25p. diagrs. (NACA TN 3152)

ANALYSIS OF LAMINAR FORCED-CONVECTION HEAT TRANSFER IN ENTRANCE REGION OF FLAT RECTANGULAR DUCTS. E. M. Sparrow. January 1955. 42p. diagrs. (NACA TN 3331)

ANALYSIS OF ERRORS INTRODUCED BY SEVERAL METHODS OF WEIGHTING NONUNIFORM DUCT FLOWS. DeMarquis D. Wyatt. March 1955. 40p. diagrs. (NACA TN 3400)

DIFFUSERS  
(1.4.2.1)

FLIGHT TESTS OF A TWO-DIMENSIONAL WEDGE DIFFUSER AT TRANSONIC AND SUPERSONIC SPEEDS. M. A. Faget. August 11, 1948. 21p. diagrs., photos. (NACA RM L8E27)

FLIGHT DETERMINATION OF THE DRAG AND PRESSURE RECOVERY OF AN NACA 1-40-250 NOSE INLET AT MACH NUMBERS FROM 0.9 TO 1.8. R. I. Sears and C. F. Merlet. February 28, 1951. 32p. diagrs., photos., 2 tabs. (NACA RM L50L18)

EFFECTS OF SOME PRIMARY VARIABLES OF RECTANGULAR VORTEX GENERATORS ON THE STATIC-PRESSURE RISE THROUGH A SHORT DIFFUSER. E. Floyd Valentine and Raymond B. Carroll. May 1952. 32p. diagrs., photo., tab. (NACA RM L52B13)

STARTING AND OPERATING LIMITS OF TWO SUPERSONIC WIND TUNNELS UTILIZING AUXILIARY AIR INJECTION DOWNSTREAM OF THE TEST SECTION. Henry R. Hunczak and Morris D. Rousso. September 1954. 28p. diagrs., photo. (NACA TN 3262)

Subsonic  
(1.4.2.1.1)

EFFECTS OF SEVERAL ARRANGEMENTS OF RECTANGULAR VORTEX GENERATORS ON THE STATIC-PRESSURE RISE THROUGH A SHORT 2:1 DIFFUSER. E. Floyd Valentine and Raymond B. Carroll. February 20, 1951. 35p. diagrs., photos. (NACA RM L50L04)

PRELIMINARY INVESTIGATION OF THE EFFECTS OF RECTANGULAR VORTEX GENERATORS ON THE PERFORMANCE OF A SHORT 1.9:1 STRAIGHT-WALL ANNULAR DIFFUSER. Charles C. Wood. October 1951. 27p. diagrs., photo., tab. (NACA RM L51G09)

EFFECTS OF SOME PRIMARY VARIABLES OF RECTANGULAR VORTEX GENERATORS ON THE STATIC-PRESSURE RISE THROUGH A SHORT DIFFUSER. E. Floyd Valentine and Raymond B. Carroll. May 1952. 32p. diagrs., photo., tab. (NACA RM L52B13)

EFFECTS OF COMPRESSIBILITY AT MACH NUMBERS UP TO 0.8 ON INTERNAL-FLOW CHARACTERISTICS OF A COWLING-SPINNER COMBINATION EQUIPPED WITH AN EIGHT-BLADE DUAL-ROTATION PROPELLER. Gene J. Bingham and Arvid L. Keith, Jr. June 1953. 39p. diagrs., photos. (NACA RM L53E12)

ANALYSIS OF ERRORS INTRODUCED BY SEVERAL METHODS OF WEIGHTING NONUNIFORM DUCT FLOWS. DeMarquis D. Wyatt. March 1955. 40p. diagrs. (NACA TN 3400)

LOW-SPEED INVESTIGATION OF THE EFFECTS OF ANGLE OF ATTACK ON THE PRESSURE RECOVERY OF A CIRCULAR NOSE INLET WITH SEVERAL LIP SHAPES. James R. Blackaby. May 1955. 30p. diagrs., photo. (NACA TN 3394)

Supersonic  
(1.4.2.1.2)

INVESTIGATION OF SHOCK DIFFUSERS AT MACH NUMBER 1.85. III - MULTIPLE-SHOCK AND CURVED-CONTOUR PROJECTING CONES. W. E. Moeckel and J. F. Connors. August 13, 1947. 23p. diagrs., photos. (NACA RM E7F13)

INVESTIGATION OF PERFORATED CONVERGENT-DIVERGENT DIFFUSERS WITH INITIAL BOUNDARY LAYER. Maynard I. Weinstein. August 15, 1950. 26p. diagrs., photo. (NACA RM E50F12)

THE EXTERNAL-SHOCK DRAG OF SUPERSONIC INLETS HAVING SUBSONIC ENTRANCE FLOW. Louis M. Nucci. December 20, 1950. 28p. diagrs., photos. (NACA RM L50G14a)

THE ORIGIN OF AERODYNAMIC INSTABILITY OF SUPERSONIC INLETS AT SUBCRITICAL CONDITIONS. Antonio Ferri and Louis M. Nucci. January 26, 1951. 111p. diagrs., photos., tab. (NACA RM L50K30)

INVESTIGATION OF THREE TYPES OF SUPERSONIC DIFFUSER OVER A RANGE OF MACH NUMBERS FROM 1.75 TO 2.74. L. Eugene Baughman and Lawrence I. Gould. March 12, 1951. 37p. diagrs., photos. (NACA RM E50L08)

CRITERIONS FOR PREDICTION AND CONTROL OF RAM-JET FLOW PULSATIONS. William H. Sterbentz and John C. Evvard. May 16, 1951. 63p. diagrs., photos. (NACA RM E51C27)

AN ANALYSIS OF BUZZING IN SUPERSONIC RAM JETS BY A MODIFIED ONE-DIMENSIONAL NON-STATIONARY WAVE THEORY. Robert L. Trimpi. March 1952. 72p. diagrs., photos. (NACA RM L52A18)

AMPLITUDE OF SUPERSONIC DIFFUSER FLOW PULSATIONS. William H. Sterbentz and Joseph Davids. December 1952. 23p. diagrs. (NACA RM E52I24)

METHOD AND GRAPHS FOR THE EVALUATION OF AIR-INDUCTION SYSTEMS. George B. Brajnikoff. 1953. ii, 22p. diagrs., tab. (NACA Rept. 1141. Formerly TN 2697)

A THEORY FOR STABILITY AND BUZZ PULSATION AMPLITUDE IN RAM JETS AND AN EXPERIMENTAL INVESTIGATION INCLUDING SCALE EFFECTS. Robert L. Trimpi. October 1953. 75p. diagrs., photos., 3 tabs. (NACA RM L53G28)



## Supersonic - Ducts (Cont.)

A METHOD FOR EVALUATING THE EFFECTS OF DRAG AND INLET PRESSURE RECOVERY ON PROPULSION-SYSTEM PERFORMANCE. Emil J. Kremzier. August 1954. 21p. diagrs. (NACA TN 3261)

SHOCKS IN HELICAL FLOWS THROUGH ANNULAR CASCADES OF STATOR BLADES. Robert Wasserman and Arthur W. Goldstein. December 1954. 27p. diagrs. (NACA TN 3329)

EFFECT OF A DISCONTINUITY ON TURBULENT BOUNDARY-LAYER-THICKNESS PARAMETERS WITH APPLICATION TO SHOCK-INDUCED SEPARATION. Eli Reshotko and Maurice Tucker. May 1955. 21p. diagrs. (NACA TN 3454)

## NOZZLES

(1.4.2.2)

AN 8-FOOT AXISYMMETRICAL FIXED NOZZLE FOR SUBSONIC MACH NUMBERS UP TO 0.99 AND FOR A SUPERSONIC MACH NUMBER OF 1.2. Virgil S. Ritchie, Ray H. Wright and Marshall P. Tulin. February 23, 1950. 52p. diagrs., photos., 2 tabs. (NACA RM L50A03a)

EXPERIMENTAL INVESTIGATION OF TYPICAL CONSTANT- AND VARIABLE-AREA EXHAUST NOZZLES AND EFFECTS ON AXIAL-FLOW TURBOJET-ENGINE PERFORMANCE. Lewis E. Wallner and John T. Wintler. July 1951. 43p. diagrs., photos. (NACA RM E51D19)

APPARATUS FOR OBTAINING A SUPERSONIC FLOW OF VERY SHORT DURATION AND SOME DRAG MEASUREMENTS OBTAINED WITH ITS USE. John E. Yeates, Jr., F. J. Bailey, Jr. and T. J. Voglewede. July 23, 1951. 23p. diagrs., photos. (NACA RM L9C01)

AN ACCURATE AND RAPID METHOD FOR THE DESIGN OF SUPERSONIC NOZZLES. Ivan E. Beckwith and John A. Moore. February 1955. 57p. diagrs., 3 tabs. (NACA TN 3322)

## PIPES

(1.4.2.3)

AERODYNAMIC LOSSES IN LOW-PRESSURE TAIL-PIPE EXHAUST DUCTS FOR ROCKET-PROPELLED AIRCRAFT. W. K. Hagginbotham and J. G. Thibodaux. July 20, 1948. 15p. diagrs., photos. (NACA RM L8C25)

EXPERIMENTAL EVALUATION OF MOMENTUM TERMS IN TURBULENT PIPE FLOW. Virgil A. Sandborn. January 1955. 40p. diagrs. (NACA TN 3266)

ANALYSIS OF ERRORS INTRODUCED BY SEVERAL METHODS OF WEIGHTING NONUNIFORM DUCT FLOWS. DeMarquis D. Wyatt. March 1955. 40p. diagrs. (NACA TN 3400)

ANALYSIS OF FULLY DEVELOPED TURBULENT HEAT TRANSFER AND FLOW IN AN ANNULUS WITH VARIOUS ECCENTRICITIES. Robert G. Deissler and Maynard F. Taylor. May 1955. 42p. diagrs. (NACA TN 3451)

## BENDS

(1.4.2.4)

INVESTIGATION TO DETERMINE EFFECTS OF RECTANGULAR VORTEX GENERATORS ON THE STATIC-PRESSURE DROP THROUGH A 90° CIRCULAR ELBOW. E. Floyd Valentine and Martin R. Copp. September 1953. 35p. diagrs., photos. (NACA RM L53G08)

## EXITS

(1.4.3)

A TRANSONIC INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF PLATE- AND BELL-TYPE OUTLETS FOR AUXILIARY AIR. William J. Nelson and Paul E. Dewey. September 1952. 25p. diagrs., photos. (NACA RM L52H20)

FLIGHT MEASUREMENTS OF BASE PRESSURE ON BODIES OF REVOLUTION WITH AND WITHOUT SIMULATED ROCKET CHAMBERS. Robert F. Peck. April 1955. 18p. diagrs., photo. (NACA TN 3372. Formerly RM L50I28a)

A PRELIMINARY INVESTIGATION OF AERODYNAMIC CHARACTERISTICS OF SMALL INCLINED AIR OUTLETS AT TRANSONIC MACH NUMBERS. Paul E. Dewey. May 1955. 21p. diagrs., photos. (NACA TN 3442. Formerly RM L53C10)

INVESTIGATION OF JET-ENGINE NOISE REDUCTION BY SCREENS LOCATED TRANSVERSELY ACROSS THE JET. Edmund E. Callaghan and Willard D. Coles. May 1955. 27p. diagrs., photos., tab. (NACA TN 3452)

## JET PUMPS AND THRUST AUGMENTORS

(1.4.4)

EXPERIMENTAL INVESTIGATION OF TYPICAL CONSTANT- AND VARIABLE-AREA EXHAUST NOZZLES AND EFFECTS ON AXIAL-FLOW TURBOJET-ENGINE PERFORMANCE. Lewis E. Wallner and John T. Wintler. July 1951. 43p. diagrs., photos. (NACA RM E51D19)

WING-FLOW STUDY OF PRESSURE-DRAG REDUCTION AT TRANSONIC SPEED BY PROJECTING A JET OF AIR FROM THE NOSE OF A PROLATE SPHEROID OF FINENESS RATIO 6. Mitchell Lopatoff. October 1951. 20p. photos., diagrs., tab. (NACA RM L51E09)

THEORY OF THE JET SYPHON. B. Szczeniowski, University of Montreal. May 1955. 49p. diagrs., 3 tabs. (NACA TN 3385)



## CASCADES

### (1.4.5)

ICING CHARACTERISTICS AND ANTI-ICING HEAT REQUIREMENTS FOR HOLLOW AND INTERNALLY MODIFIED GAS-HEATED INLET GUIDE VANES. Vernon H. Gray and Dean T. Bowden. December 5, 1950. 49p. diagrs., photos. (NACA RM E50I08)

A VISUALIZATION STUDY OF SECONDARY FLOWS IN CASCADES. Howard Z. Herzig, Arthur G. Hansen and George R. Costello. 1954. ii, 51p. diagrs., photos. (NACA Rept. 1163. Formerly TN 2947; RM E52F19)

## THEORY

### (1.4.5.1)

LIFT AND MOMENT EQUATIONS FOR OSCILLATING AIRFOILS IN AN INFINITE UNSTAGGERED CASCADE. Alexander Mendelson and Robert W. Carroll. October 1954. 46p. diagrs., 3 tabs. (NACA TN 3263)

APPROXIMATE EFFECT OF LEADING-EDGE THICKNESS, INCIDENCE ANGLE, AND INLET MACH NUMBER ON INLET LOSSES FOR HIGH-SOLIDITY CASCADES OF LOW CAMBERED BLADES. Linwood C. Wright. December 1954. 38p. diagrs. (NACA TN 3327)

SHOCKS IN HELICAL FLOWS THROUGH ANNULAR CASCADES OF STATOR BLADES. Robert Wasserman and Arthur W. Goldstein. December 1954. 27p. diagrs. (NACA TN 3329)

## EXPERIMENT

### (1.4.5.2)

PREDICTION OF LOSSES INDUCED BY ANGLES OF ATTACK IN CASCADES OF SHARP-NOSED BLADES FOR INCOMPRESSIBLE AND SUBSONIC COMPRESSIBLE FLOW. James J. Kramer and John D. Stanitz. January 1955. 45p. diagrs. (NACA TN 3149)

INVESTIGATION OF POWER REQUIREMENTS FOR ICE PREVENTION AND CYCLICAL DE-ICING OF INLET GUIDE VANES WITH INTERNAL ELECTRIC HEATERS. Uwe von Glahn and Robert E. Blatz. December 1, 1950. 49p. diagrs., photos. (NACA RM E50H29)

SECONDARY FLOWS AND BOUNDARY-LAYER ACCUMULATIONS IN TURBINE NOZZLES. Harold E. Rohlik, Milton G. Kofskey, Hubert W. Allen and Howard Z. Herzig. 1954. ii, 32p. diagrs., photos., 3 tabs. (NACA Rept. 1168. Formerly TN 2871; TN 2909; TN 2989)

SMOKE STUDY OF NOZZLE SECONDARY FLOWS IN A LOW-SPEED TURBINE. Milton G. Kofskey and Hubert W. Allen. November 1954. 24p. diagrs., photos. (NACA TN 3260)

APPROXIMATE EFFECT OF LEADING-EDGE THICKNESS, INCIDENCE ANGLE, AND INLET MACH NUMBER ON INLET LOSSES FOR HIGH-SOLIDITY CASCADES OF LOW CAMBERED BLADES. Linwood C. Wright. December 1954. 38p. diagrs. (NACA TN 3327)

## BOUNDARY LAYER

### (1.4.7)

AN EXPERIMENTAL INVESTIGATION AT SUPER-SONIC SPEEDS OF ANNULAR DUCT INLETS SITUATED IN A REGION OF APPRECIABLE BOUNDARY LAYER. Wallace F. Davis, George B. Brajnikoff, David L. Goldstein and Joseph M. Spiegel. September 24, 1947. 41p. diagrs., photos. (NACA RM A7G15)

STUDY OF THE MOMENTUM DISTRIBUTION OF TURBULENT BOUNDARY LAYERS IN ADVERSE PRESSURE GRADIENTS. Virgil A. Sandborn and Raymond J. Slogar. January 1955. 79p. diagrs., photos. (NACA TN 3264)

ANALYSIS OF LAMINAR FORCED-CONVECTION HEAT TRANSFER IN ENTRANCE REGION OF FLAT RECTANGULAR DUCTS. E. M. Sparrow. January 1955. 42p. diagrs. (NACA TN 3331)

LOW-SPEED WIND-TUNNEL INVESTIGATION OF A TRIANGULAR SWEPTBACK AIR INLET IN THE ROOT OF A 45° SWEPTBACK WING. Arvid L. Keith, Jr. and Jack Schiff. January 1955. 65p. diagrs., photos., 5 tabs. (NACA TN 3363. Formerly RM L50I01)

SIMILAR SOLUTIONS FOR THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH HEAT TRANSFER AND PRESSURE GRADIENT. Clarence B. Cohen and Eli Reshotko. February 1955. 67p. diagrs., 2 tabs. (NACA TN 3325)

A THEORY FOR PREDICTING THE FLOW OF REAL GASES IN SHOCK TUBES WITH EXPERIMENTAL VERIFICATION. Robert L. Trimpi and Nathaniel B. Cohen. March 1955. 69p. diagrs., photo. (NACA TN 3375)

LAMINAR BOUNDARY LAYER BEHIND SHOCK ADVANCING INTO STATIONARY FLUID. Harold Mirels. March 1955. 25p. diagrs., 2 tabs. (NACA TN 3401)

THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH HEAT TRANSFER AND ARBITRARY PRESSURE GRADIENT. Clarence B. Cohen and Eli Reshotko. April 1955. 43p. diagrs., 2 tabs. (NACA TN 3326)

LONGITUDINAL TURBULENT SPECTRUM SURVEY OF BOUNDARY LAYERS IN ADVERSE PRESSURE GRADIENTS. Virgil A. Sandborn and Raymond J. Slogar. May 1955. 40p. diagrs., tab. (NACA TN 3453)

## CHARACTERISTICS

### (1.4.7.1)

A VISUALIZATION STUDY OF SECONDARY FLOWS IN CASCADES. Howard Z. Herzig, Arthur G. Hansen and George R. Costello. 1954. ii, 51p. diagrs., photos. (NACA Rept. 1163. Formerly TN 2947; RM E52F19)



## Characteristics - Boundary Layer (Cont.)

SECONDARY FLOWS AND BOUNDARY-LAYER ACCUMULATIONS IN TURBINE NOZZLES. Harold E. Rohlik, Milton G. Kofskey, Hubert W. Allen and Howard Z. Herzig. 1954. ii, 32p. diagrs., photos., 3 tabs. (NACA Rept. 1168. Formerly TN 2871; TN 2909; TN 2989)

SMOKE STUDY OF NOZZLE SECONDARY FLOWS IN A LOW-SPEED TURBINE. Milton G. Kofskey and Hubert W. Allen. November 1954. 24p. diagrs., photos. (NACA TN 3260)

EXPERIMENTAL EVALUATION OF MOMENTUM TERMS IN TURBULENT PIPE FLOW. Virgil A. Sandborn. January 1955. 40p. diagrs. (NACA TN 3266)

## CONTROL (1.4.7.2)

EFFECTS OF SEVERAL ARRANGEMENTS OF RECTANGULAR VORTEX GENERATORS ON THE STATIC-PRESSURE RISE THROUGH A SHORT 2:1 DIFFUSER. E. Floyd Valentine and Raymond B. Carroll. February 20, 1951. 35p. diagrs., photos. (NACA RM L50L04)

LOW-SPEED INVESTIGATION OF A SEMISUBMERGED AIR SCOOP WITH AND WITHOUT BOUNDARY-LAYER SUCTION. P. Kenneth Pierpont and Robert R. Howell. February 23, 1951. 46p. diagrs., photos., 2 tabs. (NACA RM L50H15)

EFFECTS OF PROPELLER-SHANK GEOMETRY AND PROPELLER-SPINNER-JUNCTURE CONFIGURATION ON CHARACTERISTICS OF AN NACA 1-SERIES COWLING-SPINNER COMBINATION WITH AN EIGHT-BLADE DUAL-ROTATION PROPELLER. Arvid L. Keith, Jr., Gene J. Bingham and Arnold J. Rubin. September 1951. 73p. diagrs., photos., 5 tabs. (NACA RM L51F26)

PRELIMINARY INVESTIGATION OF THE EFFECTS OF RECTANGULAR VORTEX GENERATORS ON THE PERFORMANCE OF A SHORT 1.9:1 STRAIGHT-WALL ANNULAR DIFFUSER. Charles C. Wood. October 1951. 27p. diagrs., photo., tab. (NACA RM L51G09)

EFFECTS OF SOME PRIMARY VARIABLES OF RECTANGULAR VORTEX GENERATORS ON THE STATIC-PRESSURE RISE THROUGH A SHORT DIFFUSER. E. Floyd Valentine and Raymond B. Carroll. May 1952. 32p. diagrs., photo., tab. (NACA RM L52B13)

INVESTIGATION TO DETERMINE EFFECTS OF RECTANGULAR VORTEX GENERATORS ON THE STATIC-PRESSURE DROP THROUGH A 90° CIRCULAR ELBOW. E. Floyd Valentine and Martin R. Copp. September 1953. 35p. diagrs., photos. (NACA RM L53G08)

A FIBROUS-GLASS COMPACT AS A PERMEABLE MATERIAL FOR BOUNDARY-LAYER-CONTROL APPLICATIONS USING AREA SUCTION. Robert E. Dannenberg, James A. Weiberg and Bruno J. Gambucci. January 1955. 20p. diagrs., photos., 2 tabs. (NACA TN 3388)

PRELIMINARY INVESTIGATION OF A SUBMERGED AIR SCOOP UTILIZING BOUNDARY-LAYER SUCTION TO OBTAIN INCREASED PRESSURE RECOVERY. Mark R. Nichols and P. Kenneth Pierpont. April 1955. 72p. diagrs., photos., 2 tabs. (NACA TN 3437. Formerly RM L50A13)



## Propellers (1.5)

PROPELLER SECTION AERODYNAMIC CHARACTERISTICS AS DETERMINED BY MEASURING THE SECTION SURFACE PRESSURES ON AN NACA 10-(3)(08)-03 PROPELLER UNDER OPERATING CONDITIONS. Albert J. Evans. November 8, 1950. 162p. diags., 10 tabs. (NACA RM L50H03)

ANALYTICAL STUDY OF STATIC AND LOW-SPEED PERFORMANCE OF THIN PROPELLERS USING TWO-SPEED GEAR RATIOS TO OBTAIN OPTIMUM ROTATIONAL SPEEDS. Jean Gilman, Jr. November 1952. 52p. diags., 4 tabs. (NACA RM L52I09)

CALCULATION OF AERODYNAMIC FORCES ON AN INCLINED DUAL-ROTATING PROPELLER. John L. Crigler and Jean Gilman, Jr. June 1953. 24p. diags. (NACA RM L53D30)

AERODYNAMIC INVESTIGATION OF A FOUR-BLADE PROPELLER OPERATING THROUGH AN ANGLE-OF-ATTACK RANGE FROM  $0^\circ$  TO  $180^\circ$ . H. Clyde McLemore and Michael D. Cannon. June 1954. 62p. diags., photo. (NACA TN 3228)

### THEORY (1.5.1)

APPLICATION OF THEODORSEN'S PROPELLER THEORY TO THE CALCULATION OF THE PERFORMANCE OF DUAL-ROTATING PROPELLERS. Jean Gilman, Jr. March 15, 1951. 31p. diags. (NACA RM L51A17)

PROPELLER LIFT AND THRUST DISTRIBUTION FROM WAKE SURVEYS OF STAGNATION CONDITIONS. Robert E. Davidson. January 1952. 19p. diags. (NACA RM L51K29)

PROPELLER INDUCED ANGLES OF ATTACK AND SECTION ANGLES OF ATTACK FOR THE NACA 10-(3)(066)-03, 10-(3)(049)-03, 10-(3)(090)-03, 10-(5)(066)-03, AND 10-(0)(066)-03 PROPELLERS. William B. Igoe and Robert E. Davidson. May 1952. 80p. diags., 10 tabs. (NACA RM L51L06)

AERODYNAMIC INVESTIGATION OF A FOUR-BLADE PROPELLER OPERATING THROUGH AN ANGLE-OF-ATTACK RANGE FROM  $0^\circ$  TO  $180^\circ$ . H. Clyde McLemore and Michael D. Cannon. June 1954. 62p. diags., photo. (NACA TN 3228)

OSCILLATING PRESSURES NEAR A STATIC PUSHER PROPELLER AT TIP MACH NUMBERS UP TO 1.20 WITH SPECIAL REFERENCE TO THE EFFECTS OF THE PRESENCE OF THE WING. Harvey H. Hubbard and Leslie W. Lassiter. July 1954. 35p. diags., photos., tab. (NACA TN 3202)

CIRCUMFERENTIAL DISTRIBUTION OF PROPELLER-SLIPSTREAM TOTAL-PRESSURE RISE AT ONE RADIAL STATION OF A TWIN-ENGINE TRANSPORT AIRPLANE. A. W. Voageley and H. A. Hart. April 1955. 24p. diags., photos. (NACA TN 3432)

### DESIGN VARIABLES (1.5.2)

INVESTIGATION OF THE NACA 4-(4)(06)-057-45A AND NACA 4-(4)(06)-057-45B TWO-BLADE SWEEP PROPELLERS AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Daniel E. Harrison. February 6, 1950. 44p. diags., photos. (NACA RM L9L05)

A DISCUSSION OF THE DESIGN OF HIGHLY SWEEP PROPELLER BLADES. Richard T. Whitcomb. May 4, 1950. 31p. diags., photos. (NACA RM L50A23)

A WIND-TUNNEL INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A FULL-SCALE SWEEPBACK PROPELLER AND TWO RELATED STRAIGHT PROPELLERS. Albert J. Evans and George Liner. January 4, 1951. 102p. diags., photos., tab. (NACA RM L50J05)

THE TORSIONAL DEFLECTIONS OF SEVERAL PROPELLERS UNDER OPERATING CONDITIONS. W. H. Gray and A. E. Allis. June 1951. 56p. diags., photos., tab. (NACA RM L51A19)

THE EFFECTS OF VARIOUS PARAMETERS, INCLUDING MACH NUMBER, ON PROPELLER-BLADE FLUTTER WITH EMPHASIS ON STALL FLUTTER. John E. Baker. January 1955. 40p. diags., 3 tabs. (NACA TN 3357. Formerly RM L50L12b)

### BLADE SECTIONS (1.5.2.1)

INVESTIGATION OF THE NACA 4-(3)(08)-03 TWO-BLADE PROPELLER AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Francis G. Morgan, Jr. November 2, 1949. 30p. diags., photos. (NACA RM L9I06)

PRESSURE DISTRIBUTIONS ON THE BLADE SECTIONS OF THE NACA 10-(3)(066)-033 PROPELLER UNDER OPERATING CONDITIONS. Julian D. Maynard and Maurice P. Murphy. January 24, 1950. 166p. diags., photos., 12 tabs. (NACA RM L9L12)

PRESSURE DISTRIBUTIONS ON THE BLADE SECTIONS OF THE NACA 10-(3)(049)-033 PROPELLER UNDER OPERATING CONDITIONS. W. H. Gray and Robert M. Hunt. February 14, 1950. 120p. diags., 11 tabs. (NACA RM L9L23)

PRESSURE DISTRIBUTIONS ON THE BLADE SECTIONS OF THE NACA 10-(3)(090)-03 PROPELLER UNDER OPERATING CONDITIONS. Peter J. Johnson. March 22, 1950. 90p. diags., 10 tabs. (NACA RM L50A26)

PRESSURE DISTRIBUTIONS ON THE BLADE SECTIONS OF THE NACA 10-(5)(066)-03 PROPELLER UNDER OPERATING CONDITIONS. Albert J. Evans and Wallace Luchuk. April 18, 1950. 99p. diags., 10 tabs. (NACA RM L50B21)



## Blade Sections - Design Variables (Cont.)

PRESSURE DISTRIBUTIONS ON THE BLADE SECTIONS OF THE NACA 10-(0)(066)-03 PROPELLER UNDER OPERATING CONDITIONS. Seymour Steinberg and Robert W. Milling. May 18, 1950. 89p. diags., 11 tabs. (NACA RM L50C03)

EFFECT OF COMPRESSIBILITY AND CAMBER AS DETERMINED FROM AN INVESTIGATION OF THE NACA 4-(3)(08)-03 AND 4-(5)(08)-03 TWO-BLADE PROPELLERS UP TO FORWARD MACH NUMBERS OF 0.925. Melvin M. Carmel, Francis G. Morgan, Jr. and Domenic A. Coppolino. June 29, 1950. 92p. diags., photo. (NACA RM L50D28)

PROPELLER SECTION AERODYNAMIC CHARACTERISTICS AS DETERMINED BY MEASURING THE SECTION SURFACE PRESSURES ON AN NACA 10-(3)(08)-03 PROPELLER UNDER OPERATING CONDITIONS. Albert J. Evans. November 8, 1950. 162p. diags., 10 tabs. (NACA RM L50H03)

PROPELLER INDUCED ANGLES OF ATTACK AND SECTION ANGLES OF ATTACK FOR THE NACA 10-(3)(066)-03, 10-(3)(049)-03, 10-(3)(090)-03, 10-(5)(066)-03, AND 10-(0)(066)-03 PROPELLERS. William E. Iggo and Robert E. Davidson. May 1952. 50p. diags., 10 tabs. (NACA RM L51L06)

AERODYNAMIC CHARACTERISTICS OF NACA 0012 AIRFOIL SECTION AT ANGLES OF ATTACK FROM 0° TO 180°. Chris C. Critzos, Harry H. Heyson and Robert W. Boswinkle, Jr. January 1955. 21p. diags. (NACA TN 3361)

## BLADE PLAN FORMS (1.5.2.4)

A DISCUSSION OF THE DESIGN OF HIGHLY SWEEPED PROPELLER BLADES. Richard T. Whitcomb. May 4, 1950. 31p. diags., photos. (NACA RM L50A23)

A WIND-TUNNEL INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A FULL-SCALE SWEEPBACK PROPELLER AND TWO RELATED STRAIGHT PROPELLERS. Albert J. Evans and George Liner. January 4, 1951. 102p. diags., photos., tab. (NACA RM L50J05)

## MACH NUMBER EFFECTS (1.5.2.5)

INVESTIGATION OF THE NACA 4-(5)(08)-03 TWO-BLADE PROPELLER AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Melvin M. Carmel. September 15, 1949. 61p. diags., photo. (NACA RM L9G06a)

INVESTIGATION OF THE NACA 4-(4)(06)-04 TWO-BLADE PROPELLER AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Daniel E. Harrison. October 28, 1949. 39p. diags., photos. (NACA RM L9I07)

INVESTIGATION OF THE NACA 4-(3)(08)-03 TWO-BLADE PROPELLER AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Francis G. Morgan, Jr. November 2, 1949. 30p. diags., photos. (NACA RM L9I06)

PRESSURE DISTRIBUTIONS ON THE BLADE SECTIONS OF THE NACA 10-(3)(066)-033 PROPELLER UNDER OPERATING CONDITIONS. Julian D. Maynard and Maurice P. Murphy. January 24, 1950. 166p. diags., photos., 12 tabs. (NACA RM L9L12)

INVESTIGATION OF THE NACA 4-(4)(06)-057-45A AND NACA 4-(4)(06)-057-45B TWO-BLADE SWEEPED PROPELLERS AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Daniel E. Harrison. February 6, 1950. 44p. diags., photos. (NACA RM L9L05)

PRESSURE DISTRIBUTIONS ON THE BLADE SECTIONS OF THE NACA 10-(3)(049)-033 PROPELLER UNDER OPERATING CONDITIONS. W. H. Gray and Robert M. Hunt. February 14, 1950. 120p. diags., 11 tabs. (NACA RM L9L23)

PRESSURE DISTRIBUTIONS ON THE BLADE SECTIONS OF THE NACA 10-(3)(090)-03 PROPELLER UNDER OPERATING CONDITIONS. Peter J. Johnson. March 22, 1950. 90p. diags., 10 tabs. (NACA RM L50A26)

PRESSURE DISTRIBUTIONS ON THE BLADE SECTIONS OF THE NACA 10-(5)(066)-03 PROPELLER UNDER OPERATING CONDITIONS. Albert J. Evans and Wallace Luchuk. April 18, 1950. 99p. diags., 10 tabs. (NACA RM L50B21)

PRESSURE DISTRIBUTIONS ON THE BLADE SECTIONS OF THE NACA 10-(0)(066)-03 PROPELLER UNDER OPERATING CONDITIONS. Seymour Steinberg and Robert W. Milling. May 18, 1950. 89p. diags., 11 tabs. (NACA RM L50C03)

INVESTIGATION OF THE NACA 3-(3)(05)-05 EIGHT-BLADE DUAL-ROTATING PROPELLER AT FORWARD MACH NUMBERS TO 0.925. Robert J. Platt, Jr. and Robert A. Shumaker. June 19, 1950. 42p. diags., photo. (NACA RM L50D21)

EFFECT OF COMPRESSIBILITY AND CAMBER AS DETERMINED FROM AN INVESTIGATION OF THE NACA 4-(3)(08)-03 AND 4-(5)(08)-03 TWO-BLADE PROPELLERS UP TO FORWARD MACH NUMBERS OF 0.925. Melvin M. Carmel, Francis G. Morgan, Jr. and Domenic A. Coppolino. June 29, 1950. 92p. diags., photo. (NACA RM L50D28)

PROPELLER SECTION AERODYNAMIC CHARACTERISTICS AS DETERMINED BY MEASURING THE SECTION SURFACE PRESSURES ON AN NACA 10-(3)(08)-03 PROPELLER UNDER OPERATING CONDITIONS. Albert J. Evans. November 8, 1950. 162p. diags., 10 tabs. (NACA RM L50H03)

A WIND-TUNNEL INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A FULL-SCALE SWEEPBACK PROPELLER AND TWO RELATED STRAIGHT PROPELLERS. Albert J. Evans and George Liner. January 4, 1951. 102p. diags., photos., tab. (NACA RM L50J05)

APPLICATION OF THEODORSEN'S PROPELLER THEORY TO THE CALCULATION OF THE PERFORMANCE OF DUAL-ROTATING PROPELLERS. Jean Gilman, Jr. March 15, 1951. 31p. diags. (NACA RM L51A17)

THRUST LOADING OF THE NACA 3-(3)(05)-05 EIGHT-BLADE DUAL-ROTATING PROPELLER AS DETERMINED FROM WAKE SURVEYS. Robert J. Platt, Jr. October 1952. 44p. diags., photo. (NACA RM L52I03)



## Mach Number Effects - Design Variables (Cont.)

ANALYTICAL STUDY OF STATIC AND LOW-SPEED PERFORMANCE OF THIN PROPELLERS USING TWO-SPEED GEAR RATIOS TO OBTAIN OPTIMUM ROTATIONAL SPEEDS. Jean Gilman, Jr. November 1952. 52p. diagrs., 4 tabs. (NACA RM L52109)

INVESTIGATION OF AN NACA 4-(5)(05)-041 FOUR-BLADE PROPELLER WITH SEVERAL SPINNERS AT MACH NUMBERS UP TO 0.90. Robert M. Reynolds, Donald A. Buell and John H. Walker. December 1952. 86p. diagrs., photos., 6 tabs. (NACA RM A52119a)

AERODYNAMIC INVESTIGATION OF A FOUR-BLADE PROPELLER OPERATING THROUGH AN ANGLE-OF-ATTACK RANGE FROM  $0^\circ$  TO  $180^\circ$ . H. Clyde McLemore and Michael D. Cannon. June 1954. 62p. diagrs., photo. (NACA TN 3228)

OSCILLATING PRESSURES NEAR A STATIC PUSHER PROPELLER AT TIP MACH NUMBERS UP TO 1.20 WITH SPECIAL REFERENCE TO THE EFFECTS OF THE PRESENCE OF THE WING. Harvey H. Hubbard and Leslie W. Lassiter. July 1954. 35p. diagrs., photos., tab. (NACA TN 3202)

MEASUREMENTS OF FREE-SPACE OSCILLATING PRESSURES NEAR A PROPELLER AT FLIGHT MACH NUMBERS TO 0.72. Arthur W. Vogeley and Max C. Kurbjun. May 1955. 24p. diagrs., photos., tab. (NACA TN 3417)

## PUSHER (1.5.2.6)

AN INVESTIGATION OF PROPELLER VIBRATIONS EXCITED BY WING WAKES. W. H. Gray and William Solomon. January 1952. 31p. diagrs., photo., tab. (NACA RM L51G13)

OSCILLATING PRESSURES NEAR A STATIC PUSHER PROPELLER AT TIP MACH NUMBERS UP TO 1.20 WITH SPECIAL REFERENCE TO THE EFFECTS OF THE PRESENCE OF THE WING. Harvey H. Hubbard and Leslie W. Lassiter. July 1954. 35p. diagrs., photos., tab. (NACA TN 3202)

## DUAL ROTATION (1.5.2.7)

THE EFFECT OF THE PROPELLER SLIPSTREAM ON THE CHARACTERISTICS OF SUBMERGED INLETS. Noel K. Delany. September 9, 1949. 41p. diagrs., photos. (NACA RM A9G15)

INVESTIGATION OF THE NACA 3-(3)(05)-05 EIGHT-BLADE DUAL-ROTATING PROPELLER AT FORWARD MACH NUMBERS TO 0.925. Robert J. Platt, Jr. and Robert A. Shumaker. June 19, 1950. 42p. diagrs., photo. (NACA RM L50D21)

APPLICATION OF THEODORSEN'S PROPELLER THEORY TO THE CALCULATION OF THE PERFORMANCE OF DUAL-ROTATING PROPELLERS. Jean Gilman, Jr. March 15, 1951. 31p. diagrs. (NACA RM L51A17)

EFFECTS OF PROPELLER-SHANK GEOMETRY AND PROPELLER-SPINNER-JUNCTURE CONFIGURATION ON CHARACTERISTICS OF AN NACA 1-SERIES COWLING-SPINNER COMBINATION WITH AN EIGHT-BLADE DUAL-ROTATION PROPELLER. Arvid L. Keith, Jr., Gene J. Bingham and Arnold J. Rubin. September 1951. 73p. diagrs., photos., 5 tabs. (NACA RM L51F26)

THRUST LOADING OF THE NACA 3-(3)(05)-05 EIGHT-BLADE DUAL-ROTATING PROPELLER AS DETERMINED FROM WAKE SURVEYS. Robert J. Platt, Jr. October 1952. 44p. diagrs., photo. (NACA RM L52103)

CALCULATION OF AERODYNAMIC FORCES ON AN INCLINED DUAL-ROTATING PROPELLER. John L. Crigler and Jean Gilman, Jr. June 1953. 24p. diagrs. (NACA RM L53D30)

EFFECTS OF COMPRESSIBILITY AT MACH NUMBERS UP TO 0.8 ON INTERNAL-FLOW CHARACTERISTICS OF A COWLING-SPINNER COMBINATION EQUIPPED WITH AN EIGHT-BLADE DUAL-ROTATION PROPELLER. Gene J. Bingham and Arvid L. Keith, Jr. June 1953. 39p. diagrs., photos. (NACA RM L53E12)

## INTERFERENCE OF BODIES (1.5.2.8)

AN INVESTIGATION OF PROPELLER VIBRATIONS EXCITED BY WING WAKES. W. H. Gray and William Solomon. January 1952. 31p. diagrs., photo., tab. (NACA RM L51G13)

INVESTIGATION OF AN NACA 4-(5)(05)-041 FOUR-BLADE PROPELLER WITH SEVERAL SPINNERS AT MACH NUMBERS UP TO 0.90. Robert M. Reynolds, Donald A. Buell and John H. Walker. December 1952. 86p. diagrs., photos., 6 tabs. (NACA RM A52119a)

OSCILLATING PRESSURES NEAR A STATIC PUSHER PROPELLER AT TIP MACH NUMBERS UP TO 1.20 WITH SPECIAL REFERENCE TO THE EFFECTS OF THE PRESENCE OF THE WING. Harvey H. Hubbard and Leslie W. Lassiter. July 1954. 35p. diagrs., photos., tab. (NACA TN 3202)

CIRCUMFERENTIAL DISTRIBUTION OF PROPELLER-SLIPSTREAM TOTAL-PRESSURE RISE AT ONE RADIAL STATION OF A TWIN-ENGINE TRANSPORT AIRPLANE. A. W. Vogeley and H. A. Hart. April 1955. 24p. diagrs., photos. (NACA TN 3432)

ON THE CALCULATION OF THE 1-P OSCILLATING AERODYNAMIC LOADS ON SINGLE-ROTATION PROPELLERS IN PITCH ON TRACTOR AIRPLANES. Vernon L. Rogallo and Paul F. Yaggy. May 1955. 28p. diagrs., photo. (NACA TN 3395)

## PITCH AND YAW (1.5.2.9)

CALCULATION OF AERODYNAMIC FORCES ON AN INCLINED DUAL-ROTATING PROPELLER. John L. Crigler and Jean Gilman, Jr. June 1953. 24p. diagrs. (NACA RM L53D30)



## Pitch and Yaw - Design Variables (Cont.)

AERODYNAMIC INVESTIGATION OF A FOUR-BLADE PROPELLER OPERATING THROUGH AN ANGLE-OF-ATTACK RANGE FROM 0° TO 180°. H. Clyde McLemore and Michael D. Cannon. June 1954. 62p. diags., photo. (NACA TN 3228)

INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A MODEL WING-PROPELLER COMBINATION AND OF THE WING AND PROPELLER SEPARATELY AT ANGLES OF ATTACK UP TO 90°. John W. Draper and Richard E. Kuhn. November 1954. 72p. diags., photos., tab. (NACA TN 3304)

## DESIGNATED TYPES (1.5.3)

INVESTIGATION OF THE NACA 4-(5)(08)-03 TWO-BLADE PROPELLER AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Melvin M. Carmel. September 15, 1949. 61p. diags., photo. (NACA RM L9G06a)

INVESTIGATION OF THE NACA 4-(4)(06)-04 TWO-BLADE PROPELLER AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Daniel E. Harrison. October 28, 1949. 39p. diags., photos. (NACA RM L9I07)

INVESTIGATION OF THE NACA 4-(3)(08)-03 TWO-BLADE PROPELLER AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Francis G. Morgan, Jr. November 2, 1949. 30p. diags., photos. (NACA RM L9I06)

INVESTIGATION OF THE NACA 4-(4)(06)-057-45A AND NACA 4-(4)(06)-057-45B TWO-BLADE SWEEP PROPELLERS AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Daniel E. Harrison. February 6, 1950. 44p. diags., photos. (NACA RM L9L05)

EFFECT OF COMPRESSIBILITY AND CAMBER AS DETERMINED FROM AN INVESTIGATION OF THE NACA 4-(3)(08)-03 AND 4-(5)(08)-03 TWO-BLADE PROPELLERS UP TO FORWARD MACH NUMBERS OF 0.925. Melvin M. Carmel, Francis G. Morgan, Jr. and Domenic A. Coppolino. June 29, 1950. 92p. diags., photo. (NACA RM L50D28)

A WIND-TUNNEL INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A FULL-SCALE SWEEPBACK PROPELLER AND TWO RELATED STRAIGHT PROPELLERS. Albert J. Evans and George Liner. January 4, 1951. 102p. diags., photos., tab. (NACA RM L50J05)

THRUST LOADING OF THE NACA 3-(3)(05)-05 EIGHT-BLADE DUAL-ROTATING PROPELLER AS DETERMINED FROM WAKE SURVEYS. Robert J. Platt, Jr. October 1952. 44p. diags., photo. (NACA RM L52I03)

INVESTIGATION OF AN NACA 4-(5)(05)-041 FOUR-BLADE PROPELLER WITH SEVERAL SPINNERS AT MACH NUMBERS UP TO 0.90. Robert M. Reynolds, Donald A. Buell and John H. Walker. December 1952. 86p. diags., photos., 6 tabs. (NACA RM A52I19a)

CALCULATION OF AERODYNAMIC FORCES ON AN INCLINED DUAL-ROTATING PROPELLER. John L. Crigler and Jean Gilman, Jr. June 1953. 24p. diags. (NACA RM L53D30)

## SLIPSTREAM (1.5.4)

INVESTIGATION OF THE NACA 4-(5)(08)-03 TWO-BLADE PROPELLER AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Melvin M. Carmel. September 15, 1949. 61p. diags., photo. (NACA RM L9G06a)

EFFECT OF COMPRESSIBILITY AND CAMBER AS DETERMINED FROM AN INVESTIGATION OF THE NACA 4-(3)(08)-03 AND 4-(5)(08)-03 TWO-BLADE PROPELLERS UP TO FORWARD MACH NUMBERS OF 0.925. Melvin M. Carmel, Francis G. Morgan, Jr. and Domenic A. Coppolino. June 29, 1950. 92p. diags., photo. (NACA RM L50D28)

PROPELLER LIFT AND THRUST DISTRIBUTION FROM WAKE SURVEYS OF STAGNATION CONDITIONS. Robert E. Davidson. January 1952. 19p. diags. (NACA RM L51K29)

THRUST LOADING OF THE NACA 3-(3)(05)-05 EIGHT-BLADE DUAL-ROTATING PROPELLER AS DETERMINED FROM WAKE SURVEYS. Robert J. Platt, Jr. October 1952. 44p. diags., photo. (NACA RM L52I03)

PRELIMINARY RESULTS FROM FLOW-FIELD MEASUREMENTS AROUND SINGLE AND TANDEM ROTORS IN THE LANGLEY FULL-SCALE TUNNEL. Harry H. Heyson. November 1954. 19p. diags., photos. (NACA TN 3242)

INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A MODEL WING-PROPELLER COMBINATION AND OF THE WING AND PROPELLER SEPARATELY AT ANGLES OF ATTACK UP TO 90°. John W. Draper and Richard E. Kuhn. November 1954. 72p. diags., photos., tab. (NACA TN 3304)

AN INVESTIGATION OF A WING-PROPELLER CONFIGURATION EMPLOYING LARGE-CHORD PLAIN FLAPS AND LARGE-DIAMETER PROPELLERS FOR LOW-SPEED FLIGHT AND VERTICAL TAKE-OFF. Richard E. Kuhn and John W. Draper. December 1954. 94p. diags., photos. (NACA TN 3307)

SOME EFFECTS OF PROPELLER OPERATION AND LOCATION ON ABILITY OF A WING WITH PLAIN FLAPS TO DEFLECT PROPELLER SLIPSTREAMS DOWNWARD FOR VERTICAL TAKE-OFF. John W. Draper and Richard E. Kuhn. January 1955. 28p. diags., photo. (NACA TN 3360)

INVESTIGATION OF EFFECTIVENESS OF LARGE-CHORD SLOTTED FLAPS IN DEFLECTING PROPELLER SLIPSTREAMS DOWNWARD FOR VERTICAL TAKE-OFF AND LOW-SPEED FLIGHT. Richard E. Kuhn and John W. Draper. January 1955. 42p. diags., photo., tab. (NACA TN 3364)

CIRCUMFERENTIAL DISTRIBUTION OF PROPELLER-SLIPSTREAM TOTAL-PRESSURE RISE AT ONE RADIAL STATION OF A TWIN-ENGINE TRANSPORT AIRPLANE. A. W. Vogeley and H. A. Hart. April 1955. 24p. diags., photos. (NACA TN 3432)



## OPERATING CONDITIONS (1.5.6)

THE EFFECT OF BLADE-SECTION CAMBER ON THE STATIC CHARACTERISTICS OF THREE NACA PROPELLERS. John H. Wood and John M. Swihart. April 1952. 40p. diags., photos. (NACA RM L51L28)

ANALYTICAL STUDY OF STATIC AND LOW-SPEED PERFORMANCE OF THIN PROPELLERS USING TWO-SPEED GEAR RATIOS TO OBTAIN OPTIMUM ROTATIONAL SPEEDS. Jean Gilman, Jr. November 1952. 52p. diags., 4 tabs. (NACA RM L52I09)

AERODYNAMIC INVESTIGATION OF A FOUR-BLADE PROPELLER OPERATING THROUGH AN ANGLE-OF-ATTACK RANGE FROM  $0^\circ$  TO  $180^\circ$ . H. Clyde McLemore and Michael D. Cannon. June 1954. 62p. diags., photo. (NACA TN 3228)

THE EFFECTS OF VARIOUS PARAMETERS, INCLUDING MACH NUMBER, ON PROPELLER-BLADE FLUTTER WITH EMPHASIS ON STALL FLUTTER. John E. Baker. January 1955. 40p. diags., 3 tabs. (NACA TN 3357. Formerly RM L50L12b)

CIRCUMFERENTIAL DISTRIBUTION OF PROPELLER-SLIPSTREAM TOTAL-PRESSURE RISE AT ONE RADIAL STATION OF A TWIN-ENGINE TRANSPORT AIRPLANE. A. W. Vogeley and H. A. Hart. April 1955. 24p. diags., photos. (NACA TN 3432)

ON THE CALCULATION OF THE 1-P OSCILLATING AERODYNAMIC LOADS ON SINGLE-ROTATION PROPELLERS IN PITCH ON TRACTOR AIRPLANES. Vernon L. Rogallo and Paul F. Yaggy. May 1955. 28p. diags., photo. (NACA TN 3395)

## PROPELLER-SPINNER-COWL COMBINATIONS (1.5.7)

EFFECTS OF PROPELLER-SHANK GEOMETRY AND PROPELLER-SPINNER-JUNCTURE CONFIGURATION ON CHARACTERISTICS OF AN NACA 1-SERIES COWLING-SPINNER COMBINATION WITH AN EIGHT-BLADE DUAL-ROTATION PROPELLER. Arvid L. Keith, Jr., Gene J. Bingham and Arnold J. Rubin. September 1951. 73p. diags., photos., 5 tabs. (NACA RM L51F26)

EFFECTS OF PROPELLER-SPINNER JUNCTURE ON THE PRESSURE-RECOVERY CHARACTERISTICS OF AN NACA 1-SERIES D-TYPE COWL IN COMBINATION WITH A FOUR-BLADE SINGLE-ROTATION PROPELLER AT MACH NUMBERS UP TO 0.83 AND AT AN ANGLE OF ATTACK OF  $0^\circ$ . Robert I. Sammonds and Ashley J. Molk. June 1952. 45p. diags., photos., tab. (NACA RM A52D01a)

INVESTIGATION OF AN NACA 4-(5)(05)-041 FOUR-BLADE PROPELLER WITH SEVERAL SPINNERS AT MACH NUMBERS UP TO 0.90. Robert M. Reynolds, Donald A. Buell and John H. Walker. December 1952. 86p. diags., photos., 6 tabs. (NACA RM A52I19a)

EFFECTS OF COMPRESSIBILITY AT MACH NUMBERS UP TO 0.8 ON INTERNAL-FLOW CHARACTERISTICS OF A COWLING-SPINNER COMBINATION EQUIPPED WITH AN EIGHT-BLADE DUAL-ROTATION PROPELLER. Gene J. Bingham and Arvid L. Keith, Jr. June 1953. 39p. diags., photos. (NACA RM L53E12)



## Rotating Wings (1.6)

AERODYNAMIC CHARACTERISTICS OF NACA 0012 AIRFOIL SECTION AT ANGLES OF ATTACK FROM  $0^\circ$  TO  $180^\circ$ . Chris C. Critzos, Harry H. Heyson and Robert W. Boswinkle, Jr. January 1955. 21p. diags. (NACA TN 3361)

### THEORY (1.6.1)

REVIEW OF INFORMATION ON INDUCED FLOW OF A LIFTING ROTOR. Alfred Gessow. August 1954. 16p. diags., photo., tab. (NACA TN 3238)

PRELIMINARY RESULTS FROM FLOW-FIELD MEASUREMENTS AROUND SINGLE AND TANDEM ROTORS IN THE LANGLEY FULL-SCALE TUNNEL. Harry H. Heyson. November 1954. 19p. diags., photos. (NACA TN 3242)

CHARTS FOR ESTIMATING PERFORMANCE OF HIGH-PERFORMANCE HELICOPTERS. Alfred Gessow and Robert J. Tapscott. January 1955. 36p. diags. (NACA TN 3323)

A METHOD FOR STUDYING THE TRANSIENT BLADE-FLAPPING BEHAVIOR OF LIFTING ROTORS AT EXTREME OPERATING CONDITIONS. Alfred Gessow and Almer D. Crim. January 1955. 27p. diags. (NACA TN 3366)

### EXPERIMENTAL STUDIES (1.6.2)

DESCRIPTION AND INVESTIGATION OF A DYNAMIC MODEL OF THE XH-17 TWO-BLADE JET-DRIVEN HELICOPTER. George W. Brooks and Maurice A. Sylvester. March 14, 1951. 49p. diags., photos., 6 tabs. (NACA RM L50I21)

WIND-TUNNEL STUDIES OF THE PERFORMANCE OF MULTIROTOR CONFIGURATIONS. Richard C. Dingeldein. August 1954. 10p. diags., photo. (NACA TN 3236)

REVIEW OF INFORMATION ON INDUCED FLOW OF A LIFTING ROTOR. Alfred Gessow. August 1954. 16p. diags., photo., tab. (NACA TN 3238)

THE EFFECT OF CONTROL STIFFNESS AND FORWARD SPEED ON THE FLUTTER OF A 1/10-SCALE DYNAMIC MODEL OF A TWO-BLADE JET-DRIVEN HELICOPTER ROTOR. George W. Brooks and Maurice A. Sylvester. April 1955. 38p. diags., photo., 3 tabs. (NACA TN 3376)

A STUDY OF NORMAL ACCELERATIONS AND OPERATING CONDITIONS EXPERIENCED BY HELICOPTERS IN COMMERCIAL AND MILITARY OPERATIONS. Marlin E. Hazen. April 1955. 34p. diags., photos., 5 tabs. (NACA TN 3434)

A DYNAMIC-MODEL STUDY OF THE EFFECT OF ADDED WEIGHTS AND OTHER STRUCTURAL VARIATIONS ON THE BLADE BENDING STRAINS OF AN EXPERIMENTAL TWO-BLADE JET-DRIVEN HELICOPTER IN HOVERING AND FORWARD FLIGHT. John Locke McCarty and George W. Brooks. May 1955. 1, 47p. diags., photo., 6 tabs. (NACA TN 3367)

### POWER DRIVEN (1.6.2.1)

REDUCTION OF HELICOPTER PARASITE DRAG. Robert D. Harrington. August 1954. 8p. diags. (NACA TN 3234)

WIND-TUNNEL STUDIES OF THE PERFORMANCE OF MULTIROTOR CONFIGURATIONS. Richard C. Dingeldein. August 1954. 10p. diags., photo. (NACA TN 3236)

HOVERING PERFORMANCE OF A HELICOPTER ROTOR USING NACA 8-H-12 AIRFOIL SECTIONS. Robert D. Powell, Jr. August 1954. 14p. diags., photos. (NACA TN 3237)

PRELIMINARY RESULTS FROM FLOW-FIELD MEASUREMENTS AROUND SINGLE AND TANDEM ROTORS IN THE LANGLEY FULL-SCALE TUNNEL. Harry H. Heyson. November 1954. 19p. diags., photos. (NACA TN 3242)



# Aircraft

## (1.7)

### AIRPLANES

#### (1.7.1)

EFFECT OF CURRENT DESIGN TRENDS ON AIRPLANE SPINS AND RECOVERIES. Anshai I. Neihouse. January 1952. 6p. diags. (NACA RM L52A09)

#### COMPONENTS IN COMBINATION (1.7.1.1)

FORCE AND LONGITUDINAL CONTROL CHARACTERISTICS OF A 1/16 - SCALE MODEL OF THE BELL XS-1 TRANSONIC RESEARCH AIRPLANE AT HIGH MACH NUMBERS. Axel T. Mattson. May 21, 1947. 32p. diags., photo., tab. (NACA RM L7A03)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE - DYNAMIC PRESSURE AND COMPARISON OF POINT AND EFFECTIVE DOWNWASH AT THE TAIL OF THE D-558-1. Harold L. Robinson. November 4, 1948. 27p. diags. (NACA RM L8H05)

AN ANALYSIS OF AVAILABLE DATA ON EFFECTS OF WING-FUSELAGE-TAIL AND WING-NACELLE INTERFERENCE ON THE DISTRIBUTION OF THE AIR LOAD AMONG COMPONENTS OF AIRPLANES. Bertram C. Wollner. April 11, 1949. 33p. diags., tab. (NACA RM L9B10)

WIND-TUNNEL INVESTIGATION AT LOW SPEED TO DETERMINE AERODYNAMIC PROPERTIES OF A JETTISONABLE NOSE SECTION WITH CIRCULAR CROSS SECTION. Roscoe H. Goodwin. May 19, 1950. 38p. diags., photos. (NACA RM L9J13)

THE CALCULATION OF THE PATH OF A JETTISONABLE NOSE SECTION. Roscoe H. Goodwin. September 7, 1950. 35p. diags. (NACA RM L50G18)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LONGITUDINAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. September 8, 1950. 80p. diags., photos., 2 tabs. (NACA RM A50G06)

A STUDY OF THE FLOW FIELD BEHIND THE TRIANGULAR HORIZONTAL TAIL OF A CANARD AIRPLANE AT APPROXIMATELY THE VERTICAL-TAIL LOCATION BY MEANS OF A TUFT GRID. Joseph L. Johnson, Jr. October 1952. 18p. diags., tab. (NACA RM L52H11)

WING AND FUSELAGE LOADS MEASURED IN FLIGHT ON THE NORTH AMERICAN B-45 AND F-82 AIRPLANES. Paul W. Harper. February 1953. 35p. diags., 4 tabs. (NACA RM L52L09)

EFFECT OF HORIZONTAL-TAIL SPAN AND VERTICAL LOCATION ON THE AERODYNAMIC CHARACTERISTICS OF AN UNSWEPT TAIL ASSEMBLY IN SIDESLIP. Donald R. Riley. 1954. ii, 20p. diags., photos., tab. (NACA Rept. 1171. Formerly TN 2907)

REDUCTION OF HELICOPTER PARASITE DRAG. Robert D. Harrington. August 1954. 8p. diags. (NACA TN 3234)

CALCULATED SUBSONIC SPAN LOADS AND RESULTING STABILITY DERIVATIVES OF UNSWEPT AND 45° SWEPTBACK TAIL SURFACES IN SIDESLIP AND IN STEADY ROLL. M. J. Queijo and Donald R. Riley. October 1954. 110p. diags., 2 tabs. (NACA TN 3245)

ARRANGEMENT OF FUSIFORM BODIES TO REDUCE THE WAVE DRAG AT SUPERSONIC SPEEDS. Morris D. Friedman and Doris Cohen. November 1954. 23p. diags. (NACA TN 3345. Formerly RM A51120)

THEORETICAL CALCULATIONS OF THE LATERAL STABILITY DERIVATIVES FOR TRIANGULAR VERTICAL TAILS WITH SUBSONIC LEADING EDGES TRAVELING AT SUPERSONIC SPEEDS. Percy J. Bobbitt. December 1954. 68p. diags., photos., 5 tabs. (NACA TN 3240)

A THEORETICAL INVESTIGATION OF THE SHORT-PERIOD DYNAMIC LONGITUDINAL STABILITY OF AIRPLANE CONFIGURATIONS HAVING ELASTIC WINGS OF 0° TO 60° SWEEPBACK. Milton D. McLaughlin. December 1954. 39p. diags., 2 tabs. (NACA TN 3251)

THEORETICAL CALCULATIONS OF THE PRESSURES, FORCES, AND MOMENTS DUE TO VARIOUS LATERAL MOTIONS ACTING ON THIN ISOLATED VERTICAL TAILS WITH SUPERSONIC LEADING AND TRAILING EDGES. Kenneth Margolis. March 1955. 43p. diags., 10 tabs. (NACA TN 3373)

#### Wing-Fuselage (1.7.1.1.1)

WIND-TUNNEL INVESTIGATION AT A MACH NUMBER OF 1.53 OF AN AIRPLANE WITH A TRIANGULAR WING. Richard Scherrer and William R. Wimbrow. January 23, 1948. 74p. diags., photos., 2 tabs. (NACA RM A7J05)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. BASIC LONGITUDINAL STABILITY OF THE D-558-1. John B. Wright. May 12, 1948. 19p. diags., tab. (NACA RM L7K24)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. LONGITUDINAL STABILITY AND CONTROL OF THE D-558-1. John B. Wright. July 8, 1948. 47p. diags., tab. (NACA RM L8C23)

EFFECT OF WING SWEEP, TAPER, AND THICKNESS RATIO ON THE TRANSONIC DRAG CHARACTERISTICS OF WING-BODY COMBINATIONS. Jim Rogers Thompson and Charles W. Mathews. December 31, 1948. 29p. diags., photos., 2 tabs. (NACA RM L8K01)



Wing-Fuselage - Airplanes (Cont.)

AN ANALYSIS OF AVAILABLE DATA ON EFFECTS OF WING-FUSELAGE-TAIL AND WING-NACELLE INTERFERENCE ON THE DISTRIBUTION OF THE AIR LOAD AMONG COMPONENTS OF AIRPLANES. Bertram C. Wollner. April 11, 1949. 33p. diagrs., tab. (NACA RM L9B10)

EFFECT OF SWEEPBACK ON THE LOW-SPEED STATIC AND ROLLING STABILITY DERIVATIVES OF THIN TAPERED WINGS OF ASPECT RATIO 4. William Letko and Walter D. Wolhart. August 9, 1949. 36p. diagrs., photo. (NACA RM L9F14)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK  $45^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Raymond D. Vogler. August 15, 1949. 22p. diagrs. (NACA RM L9F29a)

PRELIMINARY WIND-TUNNEL INVESTIGATION AT HIGH-SUBSONIC SPEEDS OF PLANING-TAIL, BLENDED, AND AIRFOIL-FOREBODY SWEEP HULLS. John M. Riebe and Richard G. MacLeod. September 12, 1949. 33p. diagrs., photos., 3 tabs. (NACA RM L9D01)

LOW-SPEED STATIC LATERAL STABILITY CHARACTERISTICS OF A CANARD MODEL HAVING A  $60^\circ$  TRIANGULAR WING AND HORIZONTAL TAIL. William R. Bates. November 23, 1949. 29p. diagrs., tab. (NACA RM L9J12)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK  $35^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Robert F. Thompson. January 25, 1950. 22p. diagrs., tab. (NACA RM L9L12a)

AERODYNAMIC CHARACTERISTICS WITH FIXED AND FREE TRANSITION OF A MODIFIED DELTA WING IN COMBINATION WITH A FUSELAGE AT HIGH SUBSONIC SPEEDS. Edward C. Polhamus and Thomas J. King, Jr. May 2, 1950. 19p. diagrs., photos. (NACA RM L50C21)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.25 OF A 6-PERCENT-THICK TRIANGULAR WING AND 6- AND 9-PERCENT-THICK TRIANGULAR WINGS IN COMBINATION WITH A FUSELAGE. WING ASPECT RATIO 2.31, BICONVEX AIRFOIL SECTIONS. Albert W. Hall and Garland J. Morris. May 5, 1950. 22p. diagrs., photo., 2 tabs. (NACA RM L50D05)

INVESTIGATION AT HIGH SUBSONIC SPEEDS OF METHODS OF ALLEVIATING THE ADVERSE INTERFERENCE AT THE ROOT OF A SWEEPBACK WING. Lee E. Boddy. August 10, 1950. 31p. diagrs., photos. (NACA RM A50E26)

RESULTS OF FLIGHT TESTS TO DETERMINE THE ZERO-LIFT DRAG CHARACTERISTICS OF A  $60^\circ$  DELTA WING WITH NACA 65-006 AIRFOIL SECTION AND VARIOUS DOUBLE-WEDGE SECTIONS AT MACH NUMBERS FROM 0.7 TO 1.6. Clement J. Welsh. August 11, 1950. 15p. diagrs., photo. (NACA RM L50F01)

INVESTIGATION AT TRANSONIC SPEEDS OF A 35-PERCENT-CHORD AILERON ON A TAPERED WEDGE-TYPE WING OF ASPECT RATIO 2.5 WITH AND WITHOUT A FUSELAGE. Thomas R. Turner and Joseph E. Fikes. September 8, 1950. 25p. diagrs. (NACA RM L50G13a)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS AT HIGH-SUBSONIC SPEEDS OF TWO MODELS OF A TRANSONIC RESEARCH AIRPLANE WITH WINGS AND HORIZONTAL TAILS OF ASPECT RATIOS 4.2 AND 2. Arvo A. Luoma and John B. Wright. September 29, 1950. 134p. diagrs., photos., 3 tabs. (NACA RM L50H07)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.38 OF FOUR WINGS OF ASPECT RATIO 4 HAVING QUARTER-CHORD SWEEP ANGLES OF  $0^\circ$ ,  $35^\circ$ ,  $45^\circ$ , AND  $60^\circ$ . William B. Kemp, Jr., Kenneth W. Goodson and Robert A. Booth. October 10, 1950. 41p. diagrs., photos., tab. (NACA RM L50G14)

LOW-SPEED INVESTIGATION OF THE EFFECT OF SEVERAL FLAP AND SPOILER AILERONS ON THE LATERAL CHARACTERISTICS OF A  $47.5^\circ$  SWEEPBACK-WING - FUSELAGE COMBINATION AT A REYNOLDS NUMBER OF  $4.4 \times 10^6$ . Jerome Pasamanick and Thomas B. Sellers. December 8, 1950. 57p. diagrs., photo. (NACA RM L50J20)

LONGITUDINAL-CONTROL EFFECTIVENESS AND DOWNWASH CHARACTERISTICS AT A MACH NUMBER OF 1.24 OF A 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 AIRPLANE AS DETERMINED BY THE NACA WING-FLOW METHOD. Richard H. Sawyer, Robert M. Kennedy and Garland J. Morris. January 8, 1951. 37p. diagrs., photos., tab. (NACA RM L50K15)

NOTE ON FLUTTER OF A  $60^\circ$  DELTA WING ENCOUNTERED AT LOW-SUPERSONIC SPEEDS DURING THE FLIGHT OF A ROCKET-PROPELLED MODEL. William T. Lauten, Jr. and Grady L. Mitcham. May 14, 1951. 21p. diagrs., photos., 5 tabs. (NACA RM L51B28)

AN EXPERIMENTAL STUDY AT MODERATE AND HIGH SUBSONIC SPEEDS OF THE FLOW OVER WINGS WITH  $30^\circ$  AND  $45^\circ$  OF SWEEPBACK IN CONJUNCTION WITH A FUSELAGE. Richard T. Whitcomb. June 15, 1951. 56p. diagrs., photos. (NACA RM L50K27)

AN EXPERIMENTAL STUDY OF MODERATE AND HIGH SUBSONIC SPEEDS OF THE FLOW OVER WINGS WITH  $30^\circ$  AND  $45^\circ$  OF SWEEPFORWARD IN CONJUNCTION WITH A FUSELAGE. Richard T. Whitcomb. June 15, 1951. 47p. diagrs., photo. (NACA RM L50K28)

AN EXPERIMENTAL STUDY OF MODERATE AND HIGH SUBSONIC SPEEDS OF THE FLOW OVER AN UNSWEPT WING IN CONJUNCTION WITH A FUSELAGE. Richard T. Whitcomb. June 18, 1951. 35p. diagrs., photos. (NACA RM L50L07)

CONTRIBUTIONS OF WING, TAIL, AND FUSELAGE TO THE AERODYNAMIC CHARACTERISTICS OF A SEMISPAN MODEL OF A SUPERSONIC AIRPLANE CONFIGURATION AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Norman S. Silsby and James M. McKay. July 1951. 34p. diagrs., photos., tab. (NACA RM L51E01)

COMPARISON OF AIRFOIL SECTIONS ON TWO TRIANGULAR-WING-FUSELAGE CONFIGURATIONS AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Albert W. Hall and James M. McKay. August 1951. 23p. diagrs., photo., tab. (NACA RM L51F01)

THE EFFECTS ON THE AERODYNAMIC CHARACTERISTICS OF REVERSING THE WING OF A TRIANGULAR WING-BODY COMBINATION AT TRANSONIC SPEEDS AS DETERMINED BY THE NACA WING-FLOW METHOD. James M. McKay and Albert W. Hall. October 1951. 22p. diagrs., photo., 2 tabs. (NACA RM L51H23)



## AERODYNAMICS

### 70 AIRCRAFT (1.7)

#### Wing-Fuselage - Airplanes (Cont.)

LOAD DISTRIBUTION OVER A FUSELAGE IN COMBINATION WITH A SWEEP WING AT SMALL ANGLES OF ATTACK AND TRANSONIC SPEEDS. Maurice D. White and Bonne C. Look. November 1951. 26p. diags., photo., tab. (NACA RM A51H15)

SUMMARY OF RESULTS OBTAINED BY TRANSONIC-BUMP METHOD ON EFFECTS OF PLAN FORM AND THICKNESS OF LIFT AND DRAG CHARACTERISTICS OF WINGS AT TRANSONIC SPEEDS. Edward C. Polhamus. November 1951. 33p. diags., tab. (NACA RM L51H30)

INVESTIGATION OF THE DISTRIBUTION OF LIFT, DRAG, AND PITCHING MOMENT BETWEEN THE WING AND FUSELAGE OF A 1/30-SCALE SEMI-SPAN MODEL OF THE BELL X-5 AIRPLANE AT A MACH NUMBER OF 1.24 BY THE NACA WING-FLOW METHOD. Norman S. Silsby and Garland J. Morris. January 1952. 32p. diags., photos., tab. (NACA RM L51K27)

THE EFFECTIVENESS OF WING VORTEX GENERATORS IN IMPROVING THE MANEUVERING CHARACTERISTICS OF A SWEEP-WING AIRPLANE AT TRANSONIC SPEEDS. Norman M. McFadden, George A. Rathert, Jr. and Richard S. Bray. February 1952. 45p. photos., diags., tab. (NACA RM A51J18)

LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF 60° TRIANGULAR-WING AND MODIFIED 60° TRIANGULAR-WING MODELS HAVING HALF-DELTA AND HALF-DIAMOND TIP CONTROLS. Jacob H. Lichtenstein and Byron M. Jaquet. February 1952. 36p. diags., photos., tab. (NACA RM L51K08)

THE INTERFERENCE EFFECTS OF A BODY ON THE SPANWISE LOAD DISTRIBUTIONS OF TWO 45° SWEEPBACK WINGS OF ASPECT RATIO 8 FROM LOW-SPEED TESTS AT A REYNOLDS NUMBER OF  $4 \times 10^6$ . Albert P. Martina. February 1952. 48p. diags., photo., 2 tabs. (NACA RM L51K23)

THE EFFECTS ON THE AERODYNAMIC CHARACTERISTICS OF VARYING THE WING THICKNESS RATIO OF A TRIANGULAR WING-BODY CONFIGURATION AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Albert W. Hall and James M. McKay. April 1952. 27p. diags., photo., 2 tabs. (NACA RM L52B18)

SMALL-SCALE TRANSONIC INVESTIGATION OF THE EFFECTS OF PARTIAL-SPAN LEADING-EDGE CAMBER ON THE AERODYNAMIC CHARACTERISTICS OF A 50° 38' SWEEPBACK WING OF ASPECT RATIO 2.98. William J. Alford, Jr. and Andrew L. Byrnes, Jr. June 1952. 28p. diags., photo., tab. (NACA RM L52D08a)

AN ANALYSIS OF ESTIMATED AND EXPERIMENTAL TRANSONIC DOWNWASH CHARACTERISTICS AS AFFECTED BY PLAN FORM AND THICKNESS FOR WING AND WING-FUSELAGE CONFIGURATIONS. Joseph Weil, George S. Campbell and Margaret S. Diederich. November 1952. 92p. diags., 2 tabs. (NACA RM L52I22)

CORRELATION OF BUFFET BOUNDARIES PREDICTED FROM WIND-TUNNEL TESTS WITH THOSE MEASURED DURING FLIGHT TESTS ON THE F8F-1 AND X-1 AIRPLANES - TRANSONIC-BUMP METHOD. Andrew Martin and James F. Reed. December 1952. 22p. diags., photos., tab. (NACA RM A52J17)

AERODYNAMIC CHARACTERISTICS OF A REFINED DEEP-STEP PLANING-TAIL FLYING-BOAT HULL WITH VARIOUS FOREBODY AND AFTERBODY SHAPES. John M. Riebe and Rodger L. Naeseth. 1953. ii, 19p. diags., photos., 8 tabs. (NACA Rept. 1144. Formerly TN 2489; RM L8F01)

WING AND FUSELAGE LOADS MEASURED IN FLIGHT ON THE NORTH AMERICAN B-45 AND F-82 AIRPLANES. Paul W. Harper. February 1953. 35p. diags., 4 tabs. (NACA RM L52L09)

THEORETICAL INVESTIGATION OF THE EFFECTS UPON LIFT OF A GAP BETWEEN WING AND BODY OF A SLENDER WING-BODY COMBINATION. Duane W. Dugan and Katsumi Hikido. August 1954. 41p. diags. (NACA TN 3224)

APPLICATION OF TWO-DIMENSIONAL VORTEX THEORY TO THE PREDICTION OF FLOW FIELDS BEHIND WINGS OF WING-BODY COMBINATIONS AT SUBSONIC AND SUPERSONIC SPEEDS. Arthur Wm. Rogers. September 1954. (ii), 91p. diags., photo., 3 tabs. (NACA TN 3227)

INVESTIGATION OF LIFT, DRAG, AND PITCHING MOMENT OF A 60° DELTA-WING-BODY COMBINATION (AGARD CALIBRATION MODEL B) IN THE LANGLEY 9-INCH SUPERSONIC TUNNEL. August F. Bromm, Jr. September 1954. 18p. diags., photos. (NACA TN 3300)

ON THE DETERMINATION OF CERTAIN BASIC TYPES OF SUPERSONIC FLOW FIELDS. (Sulla determinazione di alcuni tipi di campi di corrente ipersonora). Carlo Ferrari. November 1954. 17p. diags. (NACA TM 1381. Trans. from Rendiconti della R. Accademie Nazionale dei Lincei, Series 8, v. 7, no. 6, Dec. 1949)

AERODYNAMIC FORCES, MOMENTS, AND STABILITY DERIVATIVES FOR SLENDER BODIES OF GENERAL CROSS SECTION. Alvin H. Sacks. November 1954. (i), 74p. diags., 2 tabs. (NACA TN 3283)

DESCRIPTION AND ANALYSIS OF A ROCKET-VEHICLE EXPERIMENT ON FLUTTER INVOLVING WING DEFORMATION AND BODY MOTIONS. H. J. Cunningham and R. R. Lundstrom. January 1955. 26p. diags., photos., 2 tabs. (NACA TN 3311. Formerly RM L50I29)

ON THE CALCULATION OF THE 1° P OSCILLATING AERODYNAMIC LOADS ON SINGLE-ROTATION PROPELLERS IN PITCH ON TRACTOR AIRPLANES. Vernon L. Rogallo and Paul F. Yaggy. May 1955. 28p. diags., photo. (NACA TN 3395)

#### Wing-Nacelle (1.7.1.1.2)

WIND-TUNNEL INVESTIGATION OF A WING-FUSELAGE COMBINATION WITH EXTERNAL STORES. H. Norman Silvers and Kenneth P. Spreemann. July 9, 1948. 55p. diags. (NACA RM L7K20)

AN ANALYSIS OF AVAILABLE DATA ON EFFECTS OF WING-FUSELAGE-TAIL AND WING-NACELLE INTERFERENCE ON THE DISTRIBUTION OF THE AIR LOAD AMONG COMPONENTS OF AIRPLANES. Bertram C. Wollner. April 11, 1949. 33p. diags., tab. (NACA RM L9B10)



## Wing-Nacelle - Airplanes (Cont.)

WING AND FUSELAGE LOADS MEASURED IN FLIGHT ON THE NORTH AMERICAN B-45 AND F-82 AIRPLANES. Paul W. Harper. February 1953. 35p. diags., 4 tabs. (NACA RM L52L09)

SOME NOTES ON THE AERODYNAMIC LOADS ASSOCIATED WITH EXTERNAL-STORE INSTALLATIONS. H. Norman Silvers and Thomas C. O'Bryan. June 1953. 17p. diags. (NACA RM L53E06a)

ON THE CALCULATION OF THE 1-P OSCILLATING AERODYNAMIC LOADS ON SINGLE-ROTATION PROPELLERS IN PITCH ON TRACTOR AIRPLANES. Vernon L. Rogallo and Paul F. Yaggy. May 1955. 28p. diags., photo. (NACA TN 3395)

## Tail-Wing and Fuselage (1.7.1.1.3)

DRAG OF A WING-BODY CONFIGURATION CONSISTING OF A SWEEP-FORWARD TAPERED WING MOUNTED ON A BODY OF FINENESS RATIO 12 MEASURED DURING FREE FALL AT TRANSONIC SPEEDS. Jim Rogers Thompson and Charles W. Mathews. March 13, 1947. 15p. diags., photos. (NACA RM L6L24)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEEP-BACK TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. John A. Zalovcik and Richard H. Sawyer. March 28, 1947. 30p. diags., photos., tab. (NACA RM L6K21)

HIGH-SPEED WIND-TUNNEL TESTS OF A MODEL PURSUIT AIRPLANE AND CORRELATION WITH FLIGHT-TEST RESULTS. Joseph W. Cleary and Lyle J. Gray. January 21, 1948. 56p. diags., photos. (NACA RM A7I16)

WIND-TUNNEL INVESTIGATION AT A MACH NUMBER OF 1.53 OF AN AIRPLANE WITH A TRIANGULAR WING. Richard Scherrer and William R. Wimbrow. January 23, 1948. 74p. diags., photos., 2 tabs. (NACA RM A7J05)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. BASIC LONGITUDINAL STABILITY OF THE D-558-1. John B. Wright. May 12, 1948. 19p. diags., tab. (NACA RM L7K24)

CURRENT STATUS OF LONGITUDINAL STABILITY. Charles J. Donlan. May 24, 1948. 16p. diags. (NACA RM L8A28)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/78-SCALE MODEL OF THE LOCKHEED YP-80A AIRPLANE. Robert N. Olson and Leslie F. Lawrence. May 28, 1948. 52p. diags. photos. (NACA RM A7L24)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. LONGITUDINAL STABILITY AND CONTROL OF THE D-558-1. John B. Wright. July 8, 1948. 47p. diags., tab. (NACA RM L8C23)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEEPBACK WING AND TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. Richard H. Sawyer and Lindsay J. Lina. July 23, 1948. 42p. diags., photos., tab. (NACA RM L8B19)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN MODEL OF A SUPERSONIC AIRPLANE CONFIGURATION AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Norman S. Silsby and James M. McKay. November 8, 1948. 30p. diags., photos., tab. (NACA RM L8G30)

AN INVESTIGATION OF THE LOW-SPEED STATIC STABILITY CHARACTERISTICS OF COMPLETE MODELS HAVING SWEEPBACK AND SWEEP FORWARD WINGS. M. Leroy Spearman and Paul Comisarow. November 19, 1948. 51p. diags., tab. photos. (NACA RM L8H31)

EFFECT OF WING SWEEP, TAPER, AND THICKNESS RATIO ON THE TRANSONIC DRAG CHARACTERISTICS OF WING-BODY COMBINATIONS. Jim Rogers Thompson and Charles W. Mathews. December 31, 1948. 29p. diags., photos., 2 tabs. (NACA RM L8K01)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Joseph Weil and Kenneth W. Goodson. February 24, 1949. 28p. diags., photo., tab. (NACA RM L9A21)

AN ANALYSIS OF AVAILABLE DATA ON EFFECTS OF WING-FUSELAGE-TAIL AND WING-NACELLE INTERFERENCE ON THE DISTRIBUTION OF THE AIR LOAD AMONG COMPONENTS OF AIRPLANES. Bertram C. Wollner. April 11, 1949. 33p. diags., tab. (NACA RM L9B10)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 35°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and Robert E. Becht. April 21, 1949. 29p. diags., photo., tab. (NACA RM L9B25)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 4, TAPER RATIO 0.3, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and Thomas J. King, Jr. July 20, 1949. 28p. diags., photo., tab. (NACA RM L9E25)

AERODYNAMIC CHARACTERISTICS OF A DELTA WING WITH LEADING EDGE SWEEP BACK 45°, ASPECT RATIO 4, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and Robert E. Becht. September 6, 1949. 29p. diags., photo., tab. (NACA RM L9G22a)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 60°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Thomas J. King, Jr. and Boyd C. Myers, II. September 6, 1949. 32p. diags., photos., tab. (NACA RM L9G27)

AERODYNAMIC CHARACTERISTICS OF A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth W. Goodson and William D. Morrison, Jr. October 21, 1949. 32p. diags., photos., tab. (NACA RM L9H22)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth W. Goodson and Albert G. Few, Jr. November 1, 1949. 34p. diags., photos., tab. (NACA RM L9I08)



## Tail-Wing and Fuselage - Airplanes (Cont.)

LOW-SPEED STATIC LATERAL STABILITY CHARACTERISTICS OF A CANARD MODEL HAVING A 60° TRIANGULAR WING AND HORIZONTAL TAIL. William R. Bates. November 23, 1949. 29p. diags., tab. (NACA RM L9J12)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 35°, ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and William D. Morrison, Jr. December 12, 1949. 32p. diags., photos., tab. (NACA RM L9K10a)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 60°, ASPECT RATIO 2, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and Thomas J. King, Jr. February 24, 1950. 31p. diags., photos., tab. (NACA RM L50A12)

AERODYNAMIC INVESTIGATION AT MACH NUMBER 1.92 OF A RECTANGULAR WING AND TAIL AND BODY CONFIGURATION AND ITS COMPONENTS. Macon C. Ellis, Jr. and Carl E. Grigsby. March 1, 1950. 96p. diags., photos., 4 tabs. (NACA RM L9L28a)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LONGITUDINAL STABILITY AND CONTROL. William B. Kemp, Jr. Robert E. Becht and Albert G. Few, Jr. March 14, 1950. 51p. diags., photos. (NACA RM L9K08)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A009 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth P. Spreemann, William D. Morrison, Jr. and Thomas B. Pasteur, Jr. April 6, 1950. 33p. diags., photos., tab. (NACA RM L50B03a)

AERODYNAMIC CHARACTERISTICS OF A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A004 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and James W. Wiggins. May 8, 1950. 31p. diags., photos., tab. (NACA RM L50C16)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LATERAL AND DIRECTIONAL STABILITY AND CONTROL. William B. Kemp, Jr. and Robert E. Becht. June 20, 1950. 97p. diags., photos. (NACA RM L50C17a)

SPIN AND RECOVERY CHARACTERISTICS OF A MODEL OF A FIGHTER TYPE OF AIRPLANE WITHOUT A HORIZONTAL TAIL AND HAVING EITHER A SINGLE VERTICAL TAIL OR TWIN VERTICAL TAILS. Lawrence J. Gale and Norrran E. Pumphrey. July 25, 1950. 23p. diags., photos., 2 tabs. (NACA RM L50F19a)

STABILITY CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL WITH VARIOUS MODIFICATIONS TO THE BASIC MODEL CONFIGURATIONS. Robert E. Becht and Albert G. Few, Jr. August 16, 1950. 47p. diags., photo. (NACA RM L50F23)

LOW-SPEED STATIC STABILITY CHARACTERISTICS OF A CANARD MODEL WITH A 45° SWEEP-BACK WING AND A 60° TRIANGULAR HORIZONTAL CONTROL SURFACE. John W. Draper. September 6, 1950. 43p. diags., photo., 2 tabs. (NACA RM L50G11)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS AT HIGH-SUBSONIC SPEEDS OF TWO MODELS OF A TRANSONIC RESEARCH AIRPLANE WITH WINGS AND HORIZONTAL TAILS OF ASPECT RATIOS 4.2 AND 2. Arvo A. Luoma and John B. Wright. September 29, 1950. 134p. diags., photos., 3 tabs. (NACA RM L50H07)

LONGITUDINAL CHARACTERISTICS AT MACH NUMBER OF 1.24 OF 1/30-SCALE SEMISPAN MODEL OF BELL X-5 VARIABLE-SWEEP AIRPLANE WITH WING SWEEP BACK 60° FROM TESTS BY NACA WING-FLOW METHOD. Norman S. Silsby, Garland J. Morris and Robert M. Kennedy. October 12, 1950. 17p. diags., photos., tab. (NACA RM L50E02a)

DAMPING IN YAW AND STATIC DIRECTIONAL STABILITY OF A CANARD AIRPLANE MODEL AND OF SEVERAL MODELS HAVING FUSELAGES OF RELATIVELY FLAT CROSS SECTION. Joseph L. Johnson. October 16, 1950. 20p. diags., tab. (NACA RM L50H30a)

THE EFFECT OF SWEEPBACK ON THE LONGITUDINAL CHARACTERISTICS AT A MACH NUMBER OF 1.24 OF A 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 AIRPLANE FROM TESTS BY THE NACA WING-FLOW METHOD. Garland J. Morris, Robert M. Kennedy and Norman S. Silsby. November 27, 1950. 22p. diags., photos., tab. (NACA RM L50I28)

STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL IN THE LANDING CONFIGURATION. Robert E. Becht. December 18, 1950. 38p. diags., photos. (NACA RM L50J27)

LONGITUDINAL-CONTROL EFFECTIVENESS AND DOWNWASH CHARACTERISTICS AT A MACH NUMBER OF 1.24 OF A 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 AIRPLANE AS DETERMINED BY THE NACA WING-FLOW METHOD. Richard H. Sawyer, Robert M. Kennedy and Garland J. Morris. January 8, 1951. 37p. diags., photos., tab. (NACA RM L50K15)

STATIC LONGITUDINAL STABILITY AND DYNAMIC CHARACTERISTICS AT HIGH ANGLES OF ATTACK AND AT LOW REYNOLDS NUMBERS OF A MODEL OF THE X-3 SUPERSONIC RESEARCH AIRPLANE. Sanger M. Burk, Jr. and Burton E. Hultz. February 6, 1951. 76p. diags., photos., 4 tabs. (NACA RM L50L19)

EFFECTS OF A FUSELAGE FLAP DIVE BRAKE ON THE AERODYNAMIC CHARACTERISTICS OF 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 VARIABLE-SWEEP AIRPLANE AT A MACH NUMBER 1.24 AS DETERMINED BY THE NACA WING-FLOW METHOD. Robert M. Kennedy. February 8, 1951. 15p. diags., photos., tab. (NACA RM L50L11a)

CONTRIBUTIONS OF WING, TAIL, AND FUSELAGE TO THE AERODYNAMIC CHARACTERISTICS OF A SEMISPAN MODEL OF A SUPERSONIC AIRPLANE CONFIGURATION AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Norman S. Silsby and James M. McKay. July 1951. 34p. diags., photos., tab. (NACA RM L51E01)



## Tail-Wing and Fuselage - Airplanes (Cont.)

STATIC LATERAL STABILITY CHARACTERISTICS OF A 1/10-SCALE MODEL OF THE X-1 AIRPLANE AT HIGH SUBSONIC MACH NUMBERS. Richard E. Kuhn and James W. Wiggins. August 1951. 25p. diags., photos. (NACA RM L51F01a)

A FLIGHT EVALUATION OF THE LONGITUDINAL STABILITY CHARACTERISTICS ASSOCIATED WITH THE PITCH-UP OF A SWEEP-WING AIRPLANE IN MANEUVERING FLIGHT AT TRANSONIC SPEEDS. Seth B. Anderson and Richard S. Bray. November 1951. 33p. diags., photo., tab.

EFFECTS OF HORIZONTAL-TAIL POSITION, AREA, AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 60° TRIANGULAR-WING MODEL HAVING VARIOUS TRIANGULAR-ALL-MOVABLE HORIZONTAL TAILS. Byron M. Jaquet. December 1951. 61p. diags., photo., tab. (NACA RM L51I06)

INVESTIGATION OF THE DISTRIBUTION OF LIFT, DRAG, AND PITCHING MOMENT BETWEEN THE WING AND FUSELAGE OF A 1/30-SCALE SEMI-SPAN MODEL OF THE BELL X-5 AIRPLANE AT A MACH NUMBER OF 1.24 BY THE NACA WING-FLOW METHOD. Norman S. Silsby and Garland J. Morris. January 1952. 32p. diags., photos., tab. (NACA RM L51K27)

EFFECT OF CURRENT DESIGN TRENDS ON AIRPLANE SPINS AND RECOVERIES. Anshul I. Neihouse. January 1952. 6p. diags. (NACA RM L52A09)

INVESTIGATION OF THE LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A VARIABLE-SWEEP AIRPLANE MODEL WITH A TWISTED AND CAMBERED WING. William B. Kemp, Jr., Robert E. Becht and Albert G. Few, Jr. February 1952. 62p. diags., photos. (NACA RM L51K22)

LOW-SPEED STABILITY CHARACTERISTICS OF A COMPLETE MODEL WITH A WING OF W PLAN FORM. Edward C. Polhamus and Robert E. Becht. April 1952. 27p. diags., photo., tab. (NACA RM L52A25)

EFFECTS OF HORIZONTAL-TAIL POSITION AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 60° TRIANGULAR-WING MODEL HAVING TWIN TRIANGULAR ALL-MOVABLE TAILS. Byron M. Jaquet. May 1952. 45p. diags., photos. (NACA RM L52B25)

AN INVESTIGATION OF THE LOW-SPEED LONGITUDINAL STABILITY CHARACTERISTICS OF A SWEEP-WING AIRPLANE MODEL WITH TWO MODIFICATIONS TO THE WING-ROOT PLAN FORM. William B. Kemp, Jr. July 1952. 17p. diags., tab. (NACA RM L52E07)

A STUDY OF THE USE OF VARIOUS HIGH-LIFT DEVICES ON THE HORIZONTAL TAIL OF A CANARD AIRPLANE MODEL AS A MEANS OF INCREASING THE ALLOWABLE CENTER-OF-GRAVITY TRAVEL. Joseph L. Johnson, Jr. January 1953. 25p. diags., 2 tabs. (NACA RM L52K18a)

FREE-FLIGHT-TUNNEL INVESTIGATION OF THE LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A MODEL HAVING A FUSELAGE OR RELATIVELY FLAT CROSS SECTION. John W. Paulson and Joseph L. Johnson, Jr. February 1953. 30p. diags., photo., tab. (NACA RM L52L22)

THE CALCULATION OF PRESSURE ON SLENDER AIRPLANES IN SUBSONIC AND SUPERSONIC FLOW. Max. A. Heaslet and Harvard Lomax. 1954. ii. 11p. diags. (NACA Rept. 1185. Formerly TN 2900)

APPLICATION OF TWO-DIMENSIONAL VORTEX THEORY TO THE PREDICTION OF FLOW FIELDS BEHIND WINGS OF WING-BODY COMBINATIONS AT SUBSONIC AND SUPERSONIC SPEEDS. Arthur Wm. Rogers. September 1954. (ii), 91p. diags., photo., 3 tabs. (NACA TN 3227)

PREDICTION OF DOWNWASH BEHIND SWEEP-WING AIRPLANES AT SUBSONIC SPEED. John DeYoung and Walter H. Barling, Jr. January 1955. 104p. diags., 3 tabs. (NACA TN 3346)

EFFECT OF LAG OF SIDEWASH ON THE VERTICAL-TAIL CONTRIBUTION TO OSCILLATORY DAMPING IN YAW OF AIRPLANE MODELS. Lewis R. Fisher and Herman S. Fletcher. January 1955. 38p. diags., photos. (NACA TN 3356)

## External Stores

### (1.7.1.1.5)

WIND-TUNNEL INVESTIGATION OF A WING-FUSELAGE COMBINATION WITH EXTERNAL STORES. H. Norman Silvers and Kenneth P. Spreemann. July 9, 1948. 55p. diags. (NACA RM L7K20)

EFFECT OF AIRFOIL SECTION AND TIP TANKS ON THE AERODYNAMIC CHARACTERISTICS AT HIGH SUBSONIC SPEEDS OF AN UNSWEEP WING OF ASPECT RATIO 5.16 AND TAPER RATIO 0.61. H. Norman Silvers and Kenneth P. Spreemann. December 1, 1949. 30p. diags., photos., 2 tabs. (NACA RM L9J04)

THE EFFECT OF TIP TANKS ON THE ROLLING CHARACTERISTICS AT HIGH SUBSONIC MACH NUMBERS OF A WING HAVING AN ASPECT RATIO OF 3 WITH QUARTER-CHORD LINE SWEEP BACK 35°. Richard E. Kuhn and Boyd C. Myers, II. January 17, 1950. 27p. diags., photo., 2 tabs. (NACA RM L9J19)

THE EFFECTS OF CENTRALLY MOUNTED WING-TIP TANKS ON THE SUBSONIC AERODYNAMIC CHARACTERISTICS OF A WING OF ASPECT RATIO 10 WITH 35° OF SWEEPBACK. Bruce E. Tinling and W. Richard Kolk. February 21, 1951. 44p. diags., photos., 2 tabs. (NACA RM A50K15)

THE EFFECT OF MASS DISTRIBUTION ON THE LOW-SPEED DYNAMIC LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A MODEL WITH A 60° TRIANGULAR WING. Joseph L. Johnson. March 9, 1951. 23p. diags., 2 tabs. (NACA RM L50K10)

PRELIMINARY STUDY OF SOME FACTORS WHICH AFFECT THE STALL-FLUTTER CHARACTERISTICS OF THIN WINGS. A. Gerald Rainey. July 1952. 33p. diags., photo., tab. (NACA RM L52D08)

SOME NOTES ON THE AERODYNAMIC LOADS ASSOCIATED WITH EXTERNAL-STORE INSTALLATIONS. H. Norman Silvers and Thomas C. O'Bryan. June 1953. 17p. diags. (NACA RM L53E06a)

SOME OBSERVATIONS ON STALL FLUTTER AND BUFFETING. A. Gerald Rainey. June 1953. 11p. diags. (NACA RM L53E15)



## External Stores - Airplanes (Cont.)

REDUCTION OF HELICOPTER PARASITE DRAG. Robert D. Harrington. August 1954. 8p. diagrs. (NACA TN 3234)

ARRANGEMENT OF FUSIFORM BODIES TO REDUCE THE WAVE DRAG AT SUPERSONIC SPEEDS. Morris D. Friedman and Doris Cohen. November 1954. 23p. diagrs. (NACA TN 3345. Formerly RM A51120)

EFFECTIVE MOMENT OF INERTIA OF FLUID IN OFFSET, INCLINED, AND SWEEP-WING TANKS UNDERGOING PITCHING OSCILLATIONS. James R. Reese and John L. Sewall. January 1955. 27p. diagrs., 6 tabs. (NACA TN 3353)

## SPECIFIC AIRPLANES (1.7.1.2)

FLIGHT-TEST MEASUREMENTS OF AILERON CONTROL SURFACE BEHAVIOUR AT SUPERCRITICAL MACH NUMBERS. Harvey H. Brown, George A. Rathert, Jr. and Lawrence A. Clousing. April 23, 1947. 26p. diagrs., photos., 2 tabs. (NACA RM A7A15)

FORCE AND LONGITUDINAL CONTROL CHARACTERISTICS OF A 1/16 - SCALE MODEL OF THE BELL XS-1 TRANSONIC RESEARCH AIRPLANE AT HIGH MACH NUMBERS. Axel T. Mattson. May 21, 1947. 32p. diagrs., photo., tab. (NACA RM L7A03)

AN ANALYSIS OF LONGITUDINAL-CONTROL PROBLEMS ENCOUNTERED IN FLIGHT AT TRANSONIC SPEEDS WITH A JET-PROPELLED AIRPLANE. Harvey H. Brown, L. Stewart Rolls and Lawrence A. Clousing. September 25, 1947. 56p. diagrs., photos., 3 tabs. (NACA RM A7G03)

MEASUREMENTS OF THE WING AND TAIL LOADS DURING THE ACCEPTANCE TESTS OF BELL XS-1 RESEARCH AIRPLANE. De E. Beeler and John P. Mayer. April 13, 1948. 25p. diagrs., photos., 2 tabs. (NACA RM L7L12)

GENERAL HANDLING-QUALITIES RESULTS OBTAINED DURING ACCEPTANCE FLIGHT TESTS OF THE BELL XS-1 AIRPLANE. Walter C. Williams, Charles M. Forsyth and Beverly P. Brown. April 19, 1948. 72p. diagrs., photos., tab. (NACA RM L8A09)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. BASIC LONGITUDINAL STABILITY OF THE D-558-1. John B. Wright. May 12, 1948. 19p. diagrs., tab. (NACA RM L7K24)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/78-SCALE MODEL OF THE LOCKHEED YP-80A AIRPLANE. Robert N. Olson and Leslie F. Lawrence. May 28, 1948. 52p. diagrs., photos. (NACA RM A7L24)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. D-558-1 SPEED-REDUCTION BRAKE AND SYMMETRICAL-PROFILE WING CHARACTERISTICS. John B. Wright. June 15, 1948. 22p. diagrs., tab. (NACA RM L8B06)

FORCE, STATIC LONGITUDINAL STABILITY, AND CONTROL CHARACTERISTICS OF A 1/16-SCALE MODEL OF THE BELL XS-1 TRANSONIC RESEARCH AIRPLANE AT HIGH MACH NUMBERS. Axel T. Mattson and Donald L. Loving. June 23, 1948. 49p. diagrs., tab. (NACA RM L8A12)

LIMITED MEASUREMENTS OF STATIC LONGITUDINAL STABILITY IN FLIGHT OF DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971). Walter C. Williams. June 24, 1948. 10p. diagrs., photos., tab. (NACA RM L8E14)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. LONGITUDINAL STABILITY AND CONTROL OF THE D-558-1. John B. Wright. July 8, 1948. 47p. diagrs., tab. (NACA RM L8C23)

DETERMINATION BY THE FREE-FALL METHOD OF THE LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE MODEL OF THE BELL XS-1 AIRPLANE AT TRANSONIC SPEEDS. James T. Matthews, Jr. and Charles W. Mathews. November 9, 1948. 19p. diagrs., photo., tab. (NACA RM L8G29a)

THEORETICAL INVESTIGATION OF THE DYNAMIC LATERAL STABILITY CHARACTERISTICS OF DOUGLAS DESIGN NO. 39C, AN EARLY VERSION OF THE X-3 RESEARCH AIRPLANE. Charles V. Bennett. January 18, 1949. 39p. diagrs., 2 tabs. (NACA RM L8L31)

STABILITY AND CONTROL DATA OBTAINED FROM FIRST FLIGHT OF X-4 AIRPLANE. Hubert M. Drake. February 7, 1949. 11p. diagrs., photos., tab. (NACA RM L9A31)

FLIGHT MEASUREMENT OF THE STABILITY CHARACTERISTICS OF THE DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN SIDESLIPS. Walter C. Williams. April 18, 1949. 23p. diagrs., photos. (NACA RM L8E14a)

MEASUREMENT OF THE DYNAMIC LATERAL STABILITY OF THE DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN RUDDER KICKS AT A MACH NUMBER OF 0.72. Hubert M. Drake. May 31, 1949. 10p. diagrs., photos. (NACA RM L9D06a)

MEASURED CHARACTERISTICS OF THE DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN TWO LANDINGS. Hubert M. Drake. June 3, 1949. 8p. diagrs., photos. (NACA RM L9D20a)

MEASUREMENTS OF AILERON EFFECTIVENESS OF BELL X-1 AIRPLANE UP TO A MACH NUMBER OF 0.82. Hubert M. Drake. June 20, 1949. 7p. diagrs. (NACA RM L9D13)

RESULTS OBTAINED FROM SECOND FLIGHT OF X-4 AIRPLANE (A.F. NO. 46-676). Walter C. Williams. July 18, 1949. 13p. diagrs., photos., tab. (NACA RM L9F21)

THE STATIC-PRESSURE ERROR OF WING AND FUSELAGE AIRSPEED INSTALLATIONS OF THE X-1 AIRPLANES IN TRANSONIC FLIGHT. Harold R. Goodman and Roxanah B. Yancey. July 22, 1949. 20p. diagrs. (NACA RM L9G22)

STABILITY AND CONTROL DATA OBTAINED FROM FOURTH AND FIFTH FLIGHTS OF THE NORTHROP X-4 AIRPLANE (A.F. NO. 46-676). George M. Valentine. August 4, 1949. 22p. diagrs., photos., tab. (NACA RM L9G25a)



## Specific Airplanes (Cont.)

RESULTS OBTAINED FROM THIRD FLIGHT OF NORTHROP X-4 AIRPLANE (A.F. NO. 46-676). Walter C. Williams. September 9, 1949. 13p. diags., photos., tab. (NACA RM L9G20a)

AN INVESTIGATION OF THE SPIN, RECOVERY, AND TUMBLING CHARACTERISTICS OF A 1/20-SCALE MODEL OF THE NORTHROP X-4 AIRPLANE. Lawrence J. Gale, Ira P. Jones, Jr. and Jack H. Wilson. January 4, 1950. 27p. diags., photos., 4 tabs. (NACA RM L9K28)

A STUDY OF THE DYNAMIC STABILITY OF THE BELL X-1 RESEARCH AIRPLANE. Edward C. Polhamus. January 10, 1950. 16p. diags., tab. (NACA RM L9K04a)

RESULTS OBTAINED DURING FLIGHTS 1 TO 6 OF THE NORTHROP X-4 AIRPLANE (A.F. NO. 46-677). James T. Matthews, Jr. January 12, 1950. 19p. diags., photos., tab. (NACA RM L9K22)

STALL CHARACTERISTICS OBTAINED FROM FLIGHT 10 OF NORTHROP X-4 NO. 2 AIRPLANE (USAF NO. 46-677). Melvin Sadoff and Thomas R. Sisk. February 27, 1950. 25p. diags., photos., tab. (NACA RM A50A04)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LONGITUDINAL STABILITY AND CONTROL. William B. Kemp, Jr. Robert E. Becht and Albert G. Few, Jr. March 14, 1950. 51p. diags., photos. (NACA RM L9K08)

MAXIMUM-LIFT INVESTIGATION OF A 1/40-SCALE X-1 AIRPLANE WING AT MACH NUMBERS FROM 0.60 TO 1.15. Thomas R. Turner. April 21, 1950. 18p. diags. (NACA RM L50C28)

THEORETICAL INVESTIGATION OF THE DYNAMIC LATERAL STABILITY CHARACTERISTICS OF THE DOUGLAS X-3 RESEARCH AIRPLANE, STUDY 41-B. Charles V. Bennett. April 27, 1950. 31p. diags., 3 tabs. (NACA RM L50B28)

AERODYNAMIC AND LATERAL-CONTROL CHARACTERISTICS OF A 1/28-SCALE MODEL OF THE BELL X-1 AIRPLANE WING-FUSELAGE COMBINATION. TRANSONIC-BUMP METHOD. Vernard E. Lockwood. May 5, 1950. 28p. diags., tab. (NACA RM L50C22)

FLIGHT INVESTIGATION OF THE AILERON CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE (BUAERO NO. 37972) AT MACH NUMBERS BETWEEN 0.6 AND 0.89. Jim Rogers Thompson, William S. Roden and John M. Eggleston. May 26, 1950. 23p. diags., photos., tab. (NACA RM L50D20)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LATERAL AND DIRECTIONAL STABILITY AND CONTROL. William B. Kemp, Jr. and Robert E. Becht. June 20, 1950. 97p. diags., photos. (NACA RM L50C17a)

LONGITUDINAL-STABILITY CHARACTERISTICS OF THE NORTHROP X-4 AIRPLANE (USAF NO. 46-677). Melvin Sadoff and Thomas R. Sisk. June 29, 1950. 24p. diags., photos., tab. (NACA RM A50D27)

STABILITY CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL WITH VARIOUS MODIFICATIONS TO THE BASIC MODEL CONFIGURATIONS. Robert E. Becht and Albert G. Few, Jr. August 16, 1950. 47p. diags., photo. (NACA RM L50F23)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LONGITUDINAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. September 8, 1950. 80p. diags., photos., 2 tabs. (NACA RM A50G06)

PRELIMINARY FLIGHT INVESTIGATION OF THE WING-DROPPING TENDENCY AND LATERAL-CONTROL CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AT TRANSONIC MACH NUMBERS. George A. Rathert, Jr., L. Stewart Rolls, Lee Winograd and George E. Cooper. September 11, 1950. 14p. diags., photo., tab. (NACA RM A50H03)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS AT HIGH-SUBSONIC SPEEDS OF TWO MODELS OF A TRANSONIC RESEARCH AIRPLANE WITH WINGS AND HORIZONTAL TAILS OF ASPECT RATIOS 4.2 AND 2. Arvo A. Luoma and John B. Wright. September 29, 1950. 134p. diags., photos., 3 tabs. (NACA RM L50H07)

LONGITUDINAL CHARACTERISTICS AT MACH NUMBER OF 1.24 OF 1/30-SCALE SEMISPAN MODEL OF BELL X-5 VARIABLE-SWEEP AIRPLANE WITH WING SWEEP BACK 60° FROM TESTS BY NACA WING-FLOW METHOD. Norman S. Silsby, Garland J. Morris and Robert M. Kennedy. October 12, 1950. 17p. diags., photos., tab. (NACA RM L50E02a)

FLIGHT CALIBRATION OF FOUR AIRSPEED SYSTEMS ON A SWEEP-WING AIRPLANE AT MACH NUMBERS UP TO 1.04 BY THE NACA RADAR-PHOTOTHEODOLITE METHOD. Jim Rogers Thompson, Richard S. Bray and George E. Cooper. October 27, 1950. 41p. diags., photos., tab. (NACA RM A50H24)

THE EFFECT OF SWEEPBACK ON THE LONGITUDINAL CHARACTERISTICS AT A MACH NUMBER OF 1.24 OF A 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 AIRPLANE FROM TESTS BY THE NACA WING-FLOW METHOD. Garland J. Morris, Robert M. Kennedy and Norman S. Silsby. November 27, 1950. 22p. diags., photos., tab. (NACA RM L50I28)

PRELIMINARY FLIGHT INVESTIGATION OF THE DYNAMIC LONGITUDINAL-STABILITY CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE. William C. Triplett and Rudolph D. Van Dyke, Jr. December 11, 1950. 26p. diags., photo., tab. (NACA RM A50J09a)

EFFECTS ON THE LATERAL OSCILLATION OF FIXING THE RUDDER AND REFLEXING THE FLAPS ON THE BELL X-1 AIRPLANE. Hubert M. Drake. December 11, 1950. 14p. diags., photo. (NACA RM L50I05)

SUMMARY REPORT OF RESULTS OBTAINED DURING DEMONSTRATION TESTS OF THE NORTHROP X-4 AIRPLANES. Melvin Sadoff and Thomas R. Sisk. December 13, 1950. 46p. diags., photos., tab. (NACA RM A50I01)

STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL IN THE LANDING CONFIGURATION. Robert E. Becht. December 18, 1950. 38p. diags., photos. (NACA RM L50J27)

LONGITUDINAL-CONTROL EFFECTIVENESS AND DOWNWASH CHARACTERISTICS AT A MACH NUMBER OF 1.24 OF A 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 AIRPLANE AS DETERMINED BY THE NACA WING-FLOW METHOD. Richard H. Sawyer, Robert M. Kennedy and Garland J. Morris. January 8, 1951. 37p. diags., photos., tab. (NACA RM L50K15)



## Specific Airplanes (Cont.)

EFFECTS ON THE SNAKING OSCILLATION OF THE BELL X-1 AIRPLANE OF A TRAILING-EDGE BULB ON THE RUDDER. Hubert M. Drake and Harry P. Clagett. January 16, 1951. 14p. diagrs., photo. (NACA RM L50K01a)

STATIC LONGITUDINAL STABILITY AND DYNAMIC CHARACTERISTICS AT HIGH ANGLES OF ATTACK AND AT LOW REYNOLDS NUMBERS OF A MODEL OF THE X-3 SUPERSONIC RESEARCH AIRPLANE. Sanger M. Burk, Jr. and Burton E. Hultz. February 6, 1951. 76p. diagrs., photos., 4 tabs. (NACA RM L50L19)

EFFECTS OF A FUSELAGE FLAP DIVE BRAKE ON THE AERODYNAMIC CHARACTERISTICS OF 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 VARIABLE-SWEEP AIRPLANE AT A MACH NUMBER 1.24 AS DETERMINED BY THE NACA WING-FLOW METHOD. Robert M. Kennedy. February 8, 1951. 15p. diagrs., photos., tab. (NACA RM L50L11a)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LATERAL AND DIRECTIONAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. March 16, 1951. 56p. diagrs., photos., tab. (RM A51A16)

FLIGHT INVESTIGATION OF THE LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE (BUAERO NO 37972) AT MACH NUMBERS UP TO 0.89. Melvin Sadoff, William S. Roden and John M. Eggleston. June 1951. 26p. diagrs., photos., tab. (NACA RM L51D18)

A COMPARISON OF THE MEASURED AND PREDICTED LATERAL OSCILLATORY CHARACTERISTICS OF A 35° SWEEP-WING FIGHTER AIRPLANE. Walter E. McNeill and George E. Cooper. July 1951. 21p. diagrs., 3 tabs. (NACA RM A51C28)

BUFFETING-LOAD MEASUREMENTS ON A JET-POWERED BOMBER AIRPLANE WITH REFLEXED FLAPS. John A. See and William S. Aiken, Jr. August 1951. 28p. diagrs., 3 tabs. (NACA RM L51E24a)

STATIC LATERAL STABILITY CHARACTERISTICS OF A 1/10-SCALE MODEL OF THE X-1 AIRPLANE AT HIGH SUBSONIC MACH NUMBERS. Richard E. Kuhn and James W. Wiggins. August 1951. 25p. diagrs., photos. (NACA RM L51F01a)

TABULATED PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS MEASURED IN FLIGHT ON THE WING OF THE D-558-I RESEARCH AIRPLANE THROUGH A MACH NUMBER RANGE OF 0.80 TO 0.89 AND THROUGHOUT THE NORMAL-FORCE-COEFFICIENT RANGE AT MACH NUMBERS OF 0.61, 0.70, 0.855, AND 0.88. Earl R. Keener and Rozalia M. Bandish. August 1951. 43p. diagrs., photos., 7 tabs. (NACA RM L51F12)

FLIGHT DETERMINATION OF THE EFFECTS OF WING VORTEX GENERATORS ON THE AERODYNAMIC CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE. De E. Beeler, Donald R. Bellman and John H. Griffith. August 14, 1951. 23p. diagrs., photos., tab. (NACA RM L51A23)

LONGITUDINAL FREQUENCY-RESPONSE CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS, INCLUDING A METHOD FOR THE EVALUATION OF TRANSFER FUNCTIONS. William C. Triplett and G. Allan Smith. September 1951. 45p. diagrs., photo. (NACA RM A51G27)

MEASUREMENTS IN FLIGHT OF THE LONGITUDINAL CHARACTERISTICS OF TWO JET AIRCRAFT, ONE WITH A DIVING TENDENCY AND THE OTHER WITH A CLIMBING TENDENCY AT HIGH MACH NUMBERS. Seth B. Anderson. October 1951. 18p. diagrs., photos., 2 tabs. (NACA RM A51E14)

STABILITY AND CONTROL MEASUREMENTS OBTAINED DURING USAF-NACA COOPERATIVE FLIGHT-TEST PROGRAM ON THE X-4 AIRPLANE (USAF NO. 46-677). Melvin Sadoff, Herman O. Ankenbruck and William O'Hare. October 1951. 38p. diagrs., photos., tab. (NACA RM A51H09)

A FLIGHT EVALUATION OF THE LONGITUDINAL STABILITY CHARACTERISTICS ASSOCIATED WITH THE PITCH-UP OF A SWEEP-WING AIRPLANE IN MANEUVERING FLIGHT AT TRANSONIC SPEEDS. Seth B. Anderson and Richard S. Bray. November 1951. 33p. diagrs., photo., tab. (NACA RM A51I12)

PRESSURE DISTRIBUTION AT LOW SPEED ON A 1/4-SCALE BELL X-5 AIRPLANE MODEL. William B. Kemp, Jr. and Albert G. Few, Jr. December 1951. 86p. diagrs., photos. (NACA RM L51I25)

THE UNSYMMETRICAL LOAD AND BENDING MOMENT ON THE HORIZONTAL TAIL OF A JET-POWERED BOMBER MEASURED IN SIDESLIPPING FLIGHT. T. V. Cooney. January 1952. 19p. diagrs., tab. (NACA RM L51J24)

INVESTIGATION OF THE DISTRIBUTION OF LIFT, DRAG, AND PITCHING MOMENT BETWEEN THE WING AND FUSELAGE OF A 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 AIRPLANE AT A MACH NUMBER OF 1.24 BY THE NACA WING-FLOW METHOD. Norman S. Silsby and Garland J. Morris. January 1952. 32p. diagrs., photos., tab. (NACA RM L51K27)

THE EFFECTIVENESS OF WING VORTEX GENERATORS IN IMPROVING THE MANEUVERING CHARACTERISTICS OF A SWEEP-WING AIRPLANE AT TRANSONIC SPEEDS. Norman M. McFadden, George A. Rathert, Jr. and Richard S. Bray. February 1952. 45p. photos., diagrs., tab. (NACA RM A51J18)

FULL-SCALE WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF WING MODIFICATIONS AND HORIZONTAL-TAIL LOCATION ON THE LOW-SPEED STATIC LONGITUDINAL CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE. Ralph L. Maki. April 1952. 54p. diagrs., photos., 7 tabs. (NACA RM A52B05)

LATERAL AND DIRECTIONAL DYNAMIC-RESPONSE CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS. William C. Triplett and Stuart C. Brown. December 1952. 62p. diagrs., photo., 3 tabs. (NACA RM A52I17)

CORRELATION OF BUFFET BOUNDARIES PREDICTED FROM WIND-TUNNEL TESTS WITH THOSE MEASURED DURING FLIGHT TESTS ON THE F8F-1 AND X-1 AIRPLANES - TRANSONIC-BUMP METHOD. Andrew Martin and James F. Reed. December 1952. 22p. diagrs., photos., tab. (NACA RM A52J17)



## Specific Airplanes (Cont.)

MEASUREMENTS OF FLUCTUATING PRESSURES ON A 1/4-SCALE MODEL OF THE X-1 AIRPLANE WITH A 10-PERCENT-THICK WING IN THE LANGLEY 16-FOOT TRANSONIC TUNNEL.

Louis W. Habel and Seymour Steinberg. January 1953. 29p. diagrs., photos. (NACA RM L52J31)

THE VERTICAL-TAIL LOADS MEASURED DURING A FLIGHT INVESTIGATION ON A JET-POWERED BOMBER AIRPLANE. T. V. Cooney. May 1953. 32p. diagrs., photo. (NACA RM L52G21)

STEADY PROPERLY-BANKED TURNS OF TURBOJET-PROPELLED AIRPLANES. (La Virata Corretta Stazionaria Degli Aeroplani Azionati da Turboreattori). Angelo Miele. March 1955. 33p. diagrs., tab. (NACA TM 1382. Trans. from Rivista Aeronautica, v.27, no.1, 1951, p.23-35)

## PERFORMANCE

### (1.7.1.3)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/78-SCALE MODEL OF THE LOCKHEED YP-80A AIRPLANE. Robert N. Olson and Leslie F. Lawrence. May 28, 1948. 52p. diagrs., photos. (NACA RM A7L24)

MEASURED CHARACTERISTICS OF THE DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN TWO LANDINGS. Hubert M. Drake. June 3, 1949. 8p. diagrs., photos. (NACA RM L9D20a)

THE EFFECTIVENESS OF WING VORTEX GENERATORS IN IMPROVING THE MANEUVERING CHARACTERISTICS OF A SWEEPED-WING AIRPLANE AT TRANSONIC SPEEDS. Norman M. McFadden, George A. Rathert, Jr. and Richard S. Bray. February 1952. 45p. photos., diagrs., tab. (NACA RM A51J18)

A METHOD FOR EVALUATING THE EFFECTS OF DRAG AND INLET PRESSURE RECOVERY ON PROPULSION-SYSTEM PERFORMANCE. Emil J. Kremzier. August 1954. 21p. diagrs. (NACA TN 3261)

INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A MODEL WING-PROPELLER COMBINATION AND OF THE WING AND PROPELLER SEPARATELY AT ANGLES OF ATTACK UP TO 90°. John W. Draper and Richard E. Kuhn. November 1954. 72p. diagrs., photos., tab. (NACA TN 3304)

AN INVESTIGATION OF A WING-PROPELLER CONFIGURATION EMPLOYING LARGE-CHORD PLAIN FLAPS AND LARGE-DIAMETER PROPELLERS FOR LOW-SPEED FLIGHT AND VERTICAL TAKE-OFF. Richard E. Kuhn and John W. Draper. December 1954. 94p. diagrs., photos. (NACA TN 3307)

DESIGN CONSIDERATIONS FOR WINGS HAVING MINIMUM DRAG DUE TO LIFT. Warren A. Tucker. December 1954. 26p. diagrs. (NACA TN 3317)

INVESTIGATION OF EFFECTIVENESS OF LARGE-CHORD SLOTTED FLAPS IN DEFLECTING PROPELLER SLIPSTREAMS DOWNWARD FOR VERTICAL TAKE-OFF AND LOW-SPEED FLIGHT. Richard E. Kuhn and John W. Draper. January 1955. 42p. diagrs., photo., tab. (NACA TN 3364)

## MISSILES

### (1.7.2)

A TORSIONAL STIFFNESS CRITERION FOR PREVENTING FLUTTER OF WINGS OF SUPERSONIC MISSILES. Bernard Budiansky, Joseph N. Kotanchik and Patrick T. Chiarito. August 28, 1947. 14p. diagrs., tab. (NACA RM L7G02)

RESULTS OF FLIGHT TESTS TO DETERMINE THE ZERO-LIFT DRAG CHARACTERISTICS OF A 60° DELTA WING WITH NACA 65-006 AIRFOIL SECTION AND VARIOUS DOUBLE-WEDGE SECTIONS AT MACH NUMBERS FROM 0.7 TO 1.6. Clement J. Welsh. August 11, 1950. 15p. diagrs., photo. (NACA RM L50F01)

DRAG INVESTIGATION OF SOME FIN CONFIGURATIONS FOR BOOSTER ROCKETS AT MACH NUMBERS BETWEEN 0.5 AND 1.4. John C. McFall, Jr. November 21, 1950. 17p. diagrs., photos., tab. (NACA RM L50J12)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.29 OF AN UNSWEPT TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS - TRAILING-EDGE FLAPS DEFLECTED. Louis S. Stivers, Jr. and Alexander W. Malick. December 13, 1950. 45p. diagrs., photo., 5 tabs. (NACA RM A50J09b)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.29 OF AN UNSWEPT, TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS - LEADING-EDGE FLAPS DEFLECTED. Louis S. Stivers, Jr. and Alexander W. Malick. February 26, 1951. 37p. diagrs., photo., 5 tabs. (NACA RM A50K10)

SKIN-TEMPERATURE TELEMETER FOR DETERMINING BOUNDARY-LAYER HEAT-TRANSFER COEFFICIENTS. Clifford L. Fricke and Francis B. Smith. March 15, 1951. 22p. diagrs. (NACA RM L50J17)

A SUMMARY OF AVAILABLE KNOWLEDGE CONCERNING SKIN FRICTION AND HEAT TRANSFER AND ITS APPLICATION TO THE DESIGN OF HIGH-SPEED MISSILES. Morris W. Rubesin, Charles B. Rumsey and Steven A. Varga. November 1951. 17p. diagrs. (NACA RM A51J25a)

VARIATION OF LOCAL LIQUID-WATER CONCENTRATION ABOUT AN ELLIPSOID OF FINENESS RATIO 5 MOVING IN A DROPLET FIELD. Robert G. Dorsch and Rinaldo J. Brun. July 1954. 68p. diagrs., photos., 2 tabs. (NACA TN 3153)

VARIATION OF LOCAL LIQUID-WATER CONCENTRATION ABOUT AN ELLIPSOID OF FINENESS RATIO 10 MOVING IN A DROPLET FIELD. Rinaldo J. Brun and Robert G. Dorsch. April 1955. 51p. diagrs., photo., tab. (NACA TN 3410)



## COMPONENTS IN COMBINATION (1. 7. 2. 1)

EFFECT OF WING SWEEP, TAPER, AND THICKNESS RATIO ON THE TRANSONIC DRAG CHARACTERISTICS OF WING-BODY COMBINATIONS. Jim Rogers Thompson and Charles W. Mathews. December 31, 1948. 29p. diagrs., photos., 2 tabs. (NACA RM L8K01)

A THEORETICAL INVESTIGATION OF THE INFLUENCE OF AUXILIARY DAMPING IN PITCH ON THE DYNAMIC CHARACTERISTICS OF A PROPORTIONALLY CONTROLLED SUPERSONIC CANARD MISSILE CONFIGURATION. Walter C. Nelson and Anthony L. Passera. August 25, 1950. 46p. diagrs., photo., 3 tabs. (NACA RM L50F30)

DRAG INVESTIGATION OF SOME FIN CONFIGURATIONS FOR BOOSTER ROCKETS AT MACH NUMBERS BETWEEN 0.5 AND 1.4. John C. McFall, Jr. November 21, 1950. 17p. diagrs., photos., tab. (NACA RM L50J12)

THEORETICAL INVESTIGATION OF AN AUTOMATIC CONTROL SYSTEM WITH PRIMARY SENSITIVITY TO NORMAL ACCELERATIONS AS USED TO CONTROL A SUPERSONIC CANARD MISSILE CONFIGURATION. Ernest C. Seaberg and Earl F. Smith. July 1951. 48p. diagrs., photo., 3 tabs. (NACA RM L51D23)

SYSTEM ANALYSES AND AUTOPILOT DESIGN FOR AUTOMATIC ROLL STABILIZATION OF A SUPERSONIC PILOTLESS AIRCRAFT. Jacob Zarovsky. July 1951. 55p. diagrs., tab. (NACA RM L51E07)

A THEORETICAL INVESTIGATION OF THE INFLUENCE OF AUTOPILOT NATURAL FREQUENCY UPON THE DYNAMIC PERFORMANCE CHARACTERISTICS OF A SUPERSONIC CANARD MISSILE CONFIGURATION WITH A PITCH-ATTITUDE CONTROL SYSTEM. Anthony L. Passera. October 1951. 32p. diagrs., photos., 2 tabs. (NACA RM L51H02)

A THEORETICAL INVESTIGATION OF THE EFFECT OF A TARGET SEEKER SENSITIVE TO PITCH ATTITUDE ON THE DYNAMIC STABILITY AND RESPONSE CHARACTERISTICS OF A SUPERSONIC CANARD MISSILE CONFIGURATION. Ordway B. Gates, Jr. and Albert A. Schy. August 1952. 54p. diagrs., photo., tab. (NACA RM L52E19)

THE EFFECT OF CONTROL-SURFACE-SERVO NATURAL FREQUENCY ON THE DYNAMIC PERFORMANCE CHARACTERISTICS OF AN ACCELERATION CONTROL SYSTEM APPLIED TO A SUPERSONIC MISSILE. Anthony L. Passera and Martin L. Nason. September 1953. 28p. diagrs., 3 tabs. (NACA RM L53G23a)

FLIGHT MEASUREMENTS OF DRAG AND BASE PRESSURE OF A FIN-STABILIZED PARABOLIC BODY OF REVOLUTION (NACA RM-10) AT DIFFERENT REYNOLDS NUMBERS AND AT MACH NUMBERS FROM 0.9 TO 3.3. H. Herbert Jackson, Charles B. Rumsey and Leo T. Chauvin. November 1954. 20p. diagrs., photos. (NACA TN 3320. Formerly RM L50G24)

## Wing-Body (1. 7. 2. 1. 1)

WIND-TUNNEL INVESTIGATION AT A MACH NUMBER OF 1.53 OF AN AIRPLANE WITH A TRIANGULAR WING. Richard Scherrer and William R. Wimbrow. January 23, 1948. 74p. diagrs., photos., 2 tabs. (NACA RM A7J05)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.20 OF AN ALL-MOVABLE TRIANGULAR WING OF ASPECT RATIO 4 ALONE AND WITH A BODY. Louis S. Stivers, Jr. and Alexander W. Malick. February 2, 1950. 45p. diagrs., photos., tab. (NACA RM A9L01)

FLIGHT INVESTIGATION AT MACH NUMBERS FROM 0.6 TO 1.7 TO DETERMINE DRAG AND BASE PRESSURES ON A BLUNT-TRAILING-EDGE AIRFOIL AND DRAG OF DIAMOND AND CIRCULAR-ARC AIRFOILS AT ZERO LIFT. John D. Morrow and Ellis Katz. August 11, 1950. 25p. diagrs., photos. (NACA RM L50E19a)

MEASUREMENTS OF THE EFFECT OF TRAILING-EDGE THICKNESS ON THE ZERO-LIFT DRAG OF THIN LOW-ASPECT-RATIO WINGS. John D. Morrow. August 14, 1950. 12p. diagrs., photo. (NACA RM L50F26)

TRANSONIC DRAG CHARACTERISTICS OF A WING-BODY COMBINATION USING A THIN TAPERED WING OF 45° SWEEPBACK. Max C. Kurbjun and Stanley Faber. September 28, 1950. 14p. diagrs., photo., tab. (NACA RM L50H22)

DRAG INVESTIGATION OF SOME FIN CONFIGURATIONS FOR BOOSTER ROCKETS AT MACH NUMBERS BETWEEN 0.5 AND 1.4. John C. McFall, Jr. November 21, 1950. 17p. diagrs., photos., tab. (NACA RM L50J12)

NOTE ON FLUTTER OF A 60° DELTA WING ENCOUNTERED AT LOW-SUPERSONIC SPEEDS DURING THE FLIGHT OF A ROCKET-PROPELLED MODEL. William T. Lauten, Jr. and Grady L. Mitcham. May 14, 1951. 21p. diagrs., photos., 5 tabs. (NACA RM L51B28)

LOAD DISTRIBUTION OVER A FUSELAGE IN COMBINATION WITH A SWEEP WING AT SMALL ANGLES OF ATTACK AND TRANSONIC SPEEDS. Maurice D. White and Bonne C. Look. November 1951. 26p. diagrs., photo., tab. (NACA RM A51H15)

INVESTIGATION OF LIFT AND CENTER OF PRESSURE OF LOW-ASPECT-RATIO, CRUCIFORM, TRIANGULAR, AND RECTANGULAR WINGS IN COMBINATION WITH A SLENDER FUSELAGE AT HIGH SUPERSONIC SPEEDS. Thomas N. Canning and Billy Pat Denardo. June 1952. 28p. diagrs., photos. (NACA RM A52C24)

THEORETICAL INVESTIGATION OF THE EFFECTS UPON LIFT OF A GAP BETWEEN WING AND BODY OF A SLENDER WING-BODY COMBINATION. Duane W. Dugan and Katsumi Hikido. August 1954. 41p. diagrs. (NACA TN 3224)

APPLICATION OF TWO-DIMENSIONAL VORTEX THEORY TO THE PREDICTION OF FLOW FIELDS BEHIND WINGS OF WING-BODY COMBINATIONS AT SUBSONIC AND SUPERSONIC SPEEDS. Arthur Wm. Rogers. September 1954. (ii), 91p. diagrs., photo., 3 tabs. (NACA TN 3227)



## Wing-Body - Missiles (Cont.)

AERODYNAMIC FORCES, MOMENTS, AND STABILITY DERIVATIVES FOR SLENDER BODIES OF GENERAL CROSS SECTION. Alvin H. Sacks. November 1954. (i), 74p. diagrs., 2 tabs. (NACA TN 3283)

DESCRIPTION AND ANALYSIS OF A ROCKET-VEHICLE EXPERIMENT ON FLUTTER INVOLVING WING DEFORMATION AND BODY MOTIONS. H. J. Cunningham and R. R. Lundstrom. January 1955. 26p. diagrs., photos., 2 tabs. (NACA TN 3311. Formerly RM L50129)

## Tail-Body (1.7.2.1.2)

FLIGHT TESTS TO DETERMINE THE DRAG OF FIN-STABILIZED PARABOLIC BODIES AT TRANSONIC AND SUPERSONIC SPEEDS. Sidney R. Alexander, Leo T. Chauvin and Charles B. Rumsey. April 21, 1948. 24p. diagrs., photos. (NACA RM L8A05)

DRAG MEASUREMENTS AT TRANSONIC SPEEDS OF TWO BODIES OF FINENESS RATIO 9 WITH DIFFERENT LOCATIONS OF MAXIMUM BODY DIAMETER. Jim Rogers Thompson and Max C. Kurbjun. July 22, 1948. 17p. diagrs., photos. (NACA RM L8A28b)

TESTS OF LIFTING SURFACES ON CONICAL AND CYLINDRICAL PORTIONS OF A BODY AT SUBSONIC MACH NUMBERS AND AT A MACH NUMBER OF 1.2. Robert S. Osborne and John B. Wright. September 2, 1949. 22p. diagrs. (NACA RM L9F29)

MEASUREMENTS OF THE DRAG AND PRESSURE DISTRIBUTION ON A BODY OF REVOLUTION THROUGHOUT TRANSITION FROM SUBSONIC TO SUPERSONIC SPEEDS. Jim Rogers Thompson. January 16, 1950. 36p. diagrs., photos., 2 tabs. (NACA RM L9J27)

RESULTS OF FLIGHT TESTS TO DETERMINE DRAG OF PARABOLIC AND CONE-CYLINDER BODIES OF VERY LARGE FINENESS RATIOS AT SUPERSONIC SPEEDS. Clement J. Welsh and Carlos A. deMoraes. August 1951. 17p. diagrs., photos. (NACA RM L51E18)

PRELIMINARY INVESTIGATION OF THE DRAG CHARACTERISTICS OF THE NACA RM-10 MISSILE AT MACH NUMBERS OF 1.40 AND 1.59 IN THE LANGLEY 4- BY 4-FOOT SUPERSONIC TUNNEL. Lowell E. Hasel, Archibald R. Sinclair and Clyde V. Hamilton. April 1952. 49p. diagrs., photos, 3 tabs. (NACA RM L52A14)

WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF VARIOUS DORSAL-FIN AND VERTICAL-TAIL CONFIGURATIONS ON THE DIRECTIONAL STABILITY OF A STREAMLINED BODY OF TRANSONIC SPEEDS. TRANSONIC-BUMP METHOD. Harold S. Johnson and William C. Hayes. April 1953. 22p. diagrs., photo., tab. (NACA RM L53B19)

SOME NEW DRAG DATA ON THE NACA RM-10 MISSILE AND A CORRELATION OF THE EXISTING DRAG MEASUREMENTS AT  $M = 1.6$  AND  $3.0$ . Robert J. Carros and Carlton S. James. June 1954. 24p. diagrs., photos., tab. (NACA TN 3171)

APPLICATION OF TWO-DIMENSIONAL VORTEX THEORY TO THE PREDICTION OF FLOW FIELDS BEHIND WINGS OF WING-BODY COMBINATIONS AT SUBSONIC AND SUPERSONIC SPEEDS. Arthur Wm. Rogers. September 1954. (ii), 91p. diagrs., photo., 3 tabs. (NACA TN 3227)

## Jet Interference (1.7.2.1.3)

VELOCITY AND TEMPERATURE FIELDS IN CIRCULAR JET EXPANDING FROM CHOKED NOZZLE INTO QUIESCENT AIR. Morris D. Rouso and Fred D. Kochendorfer. July 1951. 34p. diagrs., photos. (NACA RM E51F18. Formerly RM E50E03a)

## Wing-Tail-Body (1.7.2.1.4)

WIND-TUNNEL INVESTIGATION AT A MACH NUMBER OF 1.53 OF AN AIRPLANE WITH A TRIANGULAR WING. Richard Scherrer and William R. Wimbrow. January 23, 1948. 74p. diagrs., photos., 2 tabs. (NACA RM A7J05)

AERODYNAMIC INVESTIGATION AT MACH NUMBER 1.92 OF A RECTANGULAR WING AND TAIL AND BODY CONFIGURATION AND ITS COMPONENTS. Macon C. Ellis, Jr. and Carl E. Grigsby. March 1, 1950. 96p. diagrs., photos., 4 tabs. (NACA RM L9L28a)

TRANSONIC DRAG CHARACTERISTICS OF A WING-BODY COMBINATION USING A THIN TAPERED WING OF 45° SWEEPBACK. Max C. Kurbjun and Stanley Faber. September 28, 1950. 14p. diagrs., photo., tab. (NACA RM L50H22)

THE CALCULATION OF PRESSURE ON SLENDER AIRPLANES IN SUBSONIC AND SUPERSONIC FLOW. Max. A. Heaslet and Harvard Lomax. 1954. ii. 11p. diagrs. (NACA Rept. 1185. Formerly TN 2900)

APPLICATION OF TWO-DIMENSIONAL VORTEX THEORY TO THE PREDICTION OF FLOW FIELDS BEHIND WINGS OF WING-BODY COMBINATIONS AT SUBSONIC AND SUPERSONIC SPEEDS. Arthur Wm. Rogers. September 1954. (ii), 91p. diagrs., photo., 3 tabs. (NACA TN 3227)

## SPECIFIC MISSILES (1.7.2.2)

OBSERVATIONS ON AN AILERON-FLUTTER INSTABILITY ENCOUNTERED ON A 45° SWEEPBACK WING IN TRANSONIC AND SUPERSONIC FLIGHT. Marvin Pitkin, William N. Gardner and Howard J. Curfman, Jr. April 11, 1947. 23p. diagrs., photos. (NACA RM L6L09)



### Specific Missiles (Cont.)

THE PATH AND MOTION OF SCALE MODELS OF JETTISONABLE NOSE SECTIONS AT SUPERSONIC SPEEDS AS DETERMINED FROM AN INVESTIGATION IN THE LANGLEY FREE-FLIGHT APPARATUS. Lawrence J. Gale. May 23, 1950. 35p. diags., photos., 2 tabs. (NACA RM L9J13a)

CORRELATION OF SUPERSONIC CONVECTIVE HEAT-TRANSFER COEFFICIENTS FROM MEASUREMENTS OF THE SKIN TEMPERATURE OF A PARABOLIC BODY OF REVOLUTION (NACA RM-10). Leo T. Chauvin and Carlos A. deMoraes. March 7, 1951. 39p. diags., photo. 2 tabs. (NACA RM L51A18)

AVERAGE SKIN-FRICTION COEFFICIENTS FROM BOUNDARY-LAYER MEASUREMENTS IN FLIGHT ON A PARABOLIC BODY OF REVOLUTION (NACA RM-10) AT SUPERSONIC SPEEDS AND AT LARGE REYNOLDS NUMBERS. Charles B. Rumsey and J. Dan Loper. March 7, 1951. 33p. diags., photo. (NACA RM L51B12)

PRELIMINARY INVESTIGATION OF THE DRAG CHARACTERISTICS OF THE NACA RM-10 MISSILE AT MACH NUMBERS OF 1.40 AND 1.59 IN THE LANGLEY 4- BY 4-FOOT SUPERSONIC TUNNEL. Lowell E. Hasel, Archibald R. Sinclair and Clyde V. Hamilton, April 1952. 49p. diags., photos, 3 tabs. (NACA RM L52A14)

FLIGHT MEASUREMENTS OF THE EFFECTS OF SURFACE CONDITION ON THE SUPERSONIC DRAG OF FIN-STABILIZED PARABOLIC BODIES OF REVOLUTION. H. Herbert Jackson. May 1952. 17p. diags., photos. (NACA RM L52B26)

FLIGHT MEASUREMENTS OF DRAG AND BASE PRESSURE OF A FIN-STABILIZED PARABOLIC BODY OF REVOLUTION (NACA RM-10) AT DIFFERENT REYNOLDS NUMBERS AND AT MACH NUMBERS FROM 0.9 TO 3.3. H. Herbert Jackson, Charles B. Rumsey and Leo T. Chauvin. November 1954. 20p. diags., photos. (NACA TN 3320. Formerly RM L50G24)

## ROTATING-WING AIRCRAFT

### (1.7.3)

COMPARISON OF HOVERING PERFORMANCE OF HELICOPTERS POWERED BY JET-PROPULSION AND RECIPROCATING ENGINES. Virginia L. Brightwell, Max D. Peters and J. C. Sanders. June 11, 1948. 39p. diags., 3 tabs. (NACA RM E7K21)

RAPID ESTIMATION OF BENDING FREQUENCIES OF ROTATING BEAMS. Robert T. Yntema. August 1954. 18p. diags., tab. (NACA RM L54G02)

REDUCTION OF HELICOPTER PARASITE DRAG. Robert D. Harrington. August 1954. 8p. diags. (NACA TN 3234)

REVIEW OF INFORMATION ON INDUCED FLOW OF A LIFTING ROTOR. Alfred Gessow. August 1954. 16p. diags., photo., tab. (NACA TN 3238)

A METHOD FOR STUDYING THE TRANSIENT BLADE-FLAPPING BEHAVIOR OF LIFTING ROTORS AT EXTREME OPERATING CONDITIONS. Alfred Gessow and Almer D. Crim. January 1955. 27p. diags. (NACA TN 3366)

### AUTOGIROS (1.7.3.1)

CHARTS FOR ESTIMATING PERFORMANCE OF HIGH-PERFORMANCE HELICOPTERS. Alfred Gessow and Robert J. Tapscott. January 1955. 36p. diags. (NACA TN 3323)

A METHOD FOR STUDYING THE TRANSIENT BLADE-FLAPPING BEHAVIOR OF LIFTING ROTORS AT EXTREME OPERATING CONDITIONS. Alfred Gessow and Almer D. Crim. January 1955. 27p. diags. (NACA TN 3366)

### HELICOPTERS (1.7.3.2)

COMPARISON OF HOVERING PERFORMANCE OF HELICOPTERS POWERED BY JET-PROPULSION AND RECIPROCATING ENGINES. Virginia L. Brightwell, Max D. Peters and J. C. Sanders. June 11, 1948. 39p. diags., 3 tabs. (NACA RM E7K21)

STATIC DIRECTIONAL STABILITY OF A TANDEM-HELICOPTER FUSELAGE. Charles C. Smith, Jr. August 9, 1950. 23p. diags., photo. (NACA RM L50F29)

DESCRIPTION AND INVESTIGATION OF A DYNAMIC MODEL OF THE XH-17 TWO-BLADE JET-DRIVEN HELICOPTER. George W. Brooks and Maurice A. Sylvester. March 14, 1951. 49p. diags., photos., 6 tabs. (NACA RM L50I21)

PRELIMINARY INVESTIGATION OF THE CONTROL OF A GAS-TURBINE ENGINE FOR A HELICOPTER. Richard P. Krebs. September 1951. 13p. diags. (NACA RM E51F19)

SOME FLYING-QUALITIES STUDIES OF A TANDEM HELICOPTER. Kenneth B. Amer. October 1951. 29p. diags., photos. (NACA RM L51H20a)

FLIGHT TESTS OF A MAN STANDING ON A PLATFORM SUPPORTED BY A TEETERING ROTOR. Paul R. Hill and T. L. Kennedy. March 1954. 26p. diags., photos. (NACA RM L54B12a)

WIND-TUNNEL STUDIES OF THE PERFORMANCE OF MULTI-ROTOR CONFIGURATIONS. Richard C. Dingeldein. August 1954. 10p. diags., photo. (NACA TN 3236)

HOVERING PERFORMANCE OF A HELICOPTER ROTOR USING NACA 8-H-12 AIRFOIL SECTIONS. Robert D. Powell, Jr. August 1954. 14p. diags., photos. (NACA TN 3237)

SOME ASPECTS OF THE HELICOPTER NOISE PROBLEM. Harvey H. Hubbard and Leslie W. Lassiter. August 1954. 14p. diags., photo. (NACA TN 3239)



## Helicopters - Rotating-Wing Aircraft (Cont.)

PRELIMINARY RESULTS FROM FLOW-FIELD MEASUREMENTS AROUND SINGLE AND TANDEM ROTORS IN THE LANGLEY FULL-SCALE TUNNEL. Harry H. Heyson. November 1954. 19p. diagrs., photos. (NACA TN 3242)

INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A MODEL WING-PROPELLER COMBINATION AND OF THE WING AND PROPELLER SEPARATELY AT ANGLES OF ATTACK UP TO 90°. John W. Draper and Richard E. Kuhn. November 1954. 72p. diagrs., photos., tab. (NACA TN 3304)

AN INVESTIGATION OF A WING-PROPELLER CONFIGURATION EMPLOYING LARGE-CHORD PLAIN FLAPS AND LARGE-DIAMETER PROPELLERS FOR LOW-SPEED FLIGHT AND VERTICAL TAKE-OFF. Richard E. Kuhn and John W. Draper. December 1954. 94p. diagrs., photos. (NACA TN 3307)

GUST EXPERIENCE OF A HELICOPTER AND AN AIRPLANE IN FORMATION FLIGHT. Almer D. Crim. December 1954. 12p. diagrs., photos., 2 tabs. (NACA TN 3354)

CHARTS FOR ESTIMATING PERFORMANCE OF HIGH-PERFORMANCE HELICOPTERS. Alfred Gessow and Robert J. Tapscott. January 1955. 36p. diagrs. (NACA TN 3323)

INVESTIGATION OF EFFECTIVENESS OF LARGE-CHORD SLOTTED FLAPS IN DEFLECTING PROPELLER SLIPSTREAMS DOWNWARD FOR VERTICAL TAKE-OFF AND LOW-SPEED FLIGHT. Richard E. Kuhn and John W. Draper. January 1955. 42p. diagrs., photo., tab. (NACA TN 3364)

A METHOD FOR STUDYING THE TRANSIENT BLADE-FLAPPING BEHAVIOR OF LIFTING ROTORS AT EXTREME OPERATING CONDITIONS. Alfred Gessow and Almer D. Crim. January 1955. 27p. diagrs. (NACA TN 3366)

THE EFFECT OF CONTROL STIFFNESS AND FORWARD SPEED ON THE FLUTTER OF A 1/10-SCALE DYNAMIC MODEL OF A TWO-BLADE JET-DRIVEN HELICOPTER ROTOR. George W. Brooks and Maurice A. Sylvester. April 1955. 38p. diagrs., photo., 3 tabs. (NACA TN 3376)

A STUDY OF NORMAL ACCELERATIONS AND OPERATING CONDITIONS EXPERIENCED BY HELICOPTERS IN COMMERCIAL AND MILITARY OPERATIONS. Marlin E. Hazen. April 1955. 34p. diagrs., photos., 5 tabs. (NACA TN 3434)

A DYNAMIC-MODEL STUDY OF THE EFFECT OF ADDED WEIGHTS AND OTHER STRUCTURAL VARIATIONS ON THE BLADE BENDING STRAINS OF AN EXPERIMENTAL TWO-BLADE JET-DRIVEN HELICOPTER IN HOVERING AND FORWARD FLIGHT. John Locke McCarty and George W. Brooks. May 1955. i, 47p. diagrs., photo., 6 tabs. (NACA TN 3367)

## SEAPLANES (1.7.4)

### GENERAL STUDIES (1.7.4.1)

PRELIMINARY WIND-TUNNEL INVESTIGATION AT HIGH-SUBSONIC SPEEDS OF PLANING-TAIL, BLENDED, AND AIRFOIL-FOREBODY SWEPT HULLS. John M. Riebe and Richard G. MacLeod. September 12, 1949. 33p. diagrs., photos., 3 tabs. (NACA RM L9D01)

AERODYNAMIC CHARACTERISTICS OF A REFINED DEEP-STEP PLANING-TAIL FLYING-BOAT HULL WITH VARIOUS FOREBODY AND AFTERBODY SHAPES. John M. Riebe and Rodger L. Naeseth. 1953. ii, 19p. diagrs., photos., 8 tabs. (NACA Rept. 1144. Formerly TN 2489; RM L8F01)

THEORY AND PROCEDURE FOR DETERMINING LOADS AND MOTIONS IN CHINE-IMMERSED HYDRODYNAMIC IMPACTS OF PRISMATIC BODIES. Emanuel Schnitzer. 1953. ii, 29p. diagrs. (NACA Rept. 1152. Formerly TN 2813)



## Stability and Control (1.8)

FLIGHT DETERMINATION OF THE EFFECTS OF WING VORTEX GENERATORS ON THE AERODYNAMIC CHARACTERISTICS OF THE DOUGLAS D-558-1 AIRPLANE. De E. Beeler, Donald R. Bellman and John H. Griffith. August 14, 1951. 23p. diagrs., photos., tab. (NACA RM L51A23)

SOME FLYING-QUALITIES STUDIES OF A TANDEM HELICOPTER. Kenneth B. Amer. October 1951. 29p. diagrs., photos. (NACA RM L51H20a)

AN ANALYTICAL INVESTIGATION OF AIRPLANE SPIN-RECOVERY MOTION BY USE OF ROTARY-BALANCE AERODYNAMIC DATA. Stanley H. Scher. June 1954. 38p. diagrs., tab. (NACA TN 3188)

### STABILITY (1.8.1)

#### STATIC

##### (1.8.1.1)

STABILITY AND CONTROL MEASUREMENTS OBTAINED DURING USAF-NACA COOPERATIVE FLIGHT-TEST PROGRAM ON THE X-4 AIRPLANE (USAF NO. 46-677). Melvin Sadoff, Herman O. Ankenbruck and William O'Hare. October 1951. 38p. diagrs., photos., tab. (NACA RM A51H09)

INVESTIGATION OF THE LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A VARIABLE- SWEEP AIRPLANE MODEL WITH A TWISTED AND CAMBERED WING. William B. Kemp, Jr., Robert E. Becht and Albert G. Few, Jr. February 1952. 62p. diagrs., photos. (NACA RM L51K22)

AERODYNAMIC FORCES, MOMENTS, AND STABILITY DERIVATIVES FOR SLENDER BODIES OF GENERAL CROSS SECTION. Alvin H. Sacks. November 1954.(i), 74p. diagrs., 2 tabs. (NACA TN 3283)

#### Longitudinal

##### (1.8.1.1.1)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEEP-BACK TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. John A. Zalovcik and Richard H. Sawyer. March 28, 1947. 30p. diagrs., photos., tab. (NACA RM L6K21)

HIGH-SPEED WIND-TUNNEL TESTS OF A MODEL PURSUIT AIRPLANE AND CORRELATION WITH FLIGHT-TEST RESULTS. Joseph W. Cleary and Lyle J. Gray. January 21, 1948. 56p. diagrs., photos. (NACA RM A7I16)

WIND-TUNNEL INVESTIGATION AT A MACH NUMBER OF 1.53 OF AN AIRPLANE WITH A TRIANGULAR WING. Richard Scherrer and William R. Wimbrow. January 23, 1948. 74p. diagrs., photos., 2 tabs. (NACA RM A7J05)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/78-SCALE MODEL OF THE LOCKHEED YP-80A AIRPLANE. Robert N. Olson and Leslie F. Lawrence. May 28, 1948. 52p. diagrs., photos. (NACA RM A7L24)

AN INVESTIGATION OF THE LOW-SPEED STATIC STABILITY CHARACTERISTICS OF COMPLETE MODELS HAVING SWEEPBACK AND SWEEP FORWARD WINGS. M. Leroy Spearman and Paul Comisarow. November 19, 1948. 51p. diagrs., tab. photos. (NACA RM L8H31)

STABILITY AND CONTROL DATA OBTAINED FROM FIRST FLIGHT OF X-4 AIRPLANE. Hubert M. Drake. February 7, 1949. 11p. diagrs., photos., tab. (NACA RM L9A31)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Joseph Weil and Kenneth W. Goodson. February 24, 1949. 28p. diagrs., photo., tab. (NACA RM L9A21)

INVESTIGATION OF DOWNWASH AND WAKE CHARACTERISTICS AT A MACH NUMBER OF 1.53. I - RECTANGULAR WING. Edward W. Perkins and Thomas N. Canning. March 1, 1949. 29p. diagrs. (NACA RM A8L16)

FULL-SCALE INVESTIGATION OF A WING WITH THE LEADING EDGE SWEEP BACK 47.5° AND HAVING CIRCULAR-ARC AND FINITE-TRAILING-EDGE-THICKNESS AILERONS. Roy H. Lange. March 11, 1949. 16p. diagrs., photo. (NACA RM L9B02)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 35°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and Robert E. Becht. April 21, 1949. 29p. diagrs., photo., tab. (NACA RM L9B25)

STABILITY RESULTS OBTAINED WITH DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN FLIGHT UP TO A MACH NUMBER OF 0.89. William H. Barlow and Howard C. Lilly. April 22, 1949. 16p. diagrs., photos. (NACA RM L8K03)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. BASIC LONGITUDINAL STABILITY OF THE D-558-1. John B. Wright. May 12, 1948. 19p. diagrs., tab. (NACA RM L7K24)

CURRENT STATUS OF LONGITUDINAL STABILITY. Charles J. Donlan. May 24, 1948. 16p. diagrs. (NACA RM L8A28)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. D-558-1 SPEED-REDUCTION BRAKE AND SYMMETRICAL-PROFILE WING CHARACTERISTICS. John B. Wright. June 15, 1948. 22p. diagrs., tab. (NACA RM L8B06)

FORCE, STATIC LONGITUDINAL STABILITY, AND CONTROL CHARACTERISTICS OF A 1/16-SCALE MODEL OF THE BELL XS-1 TRANSONIC RESEARCH AIRPLANE AT HIGH MACH NUMBERS. Axel T. Mattson and Donald L. Loving. June 23, 1948. 49p. diagrs., tab. (NACA RM L8A12)

LIMITED MEASUREMENTS OF STATIC LONGITUDINAL STABILITY IN FLIGHT OF DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971). Walter C. Williams. June 24, 1948. 10p. diagrs., photos., tab. (NACA RM L8E14)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. LONGITUDINAL STABILITY AND CONTROL OF THE D-558-1. John B. Wright. July 8, 1948. 47p. diagrs., tab. (NACA RM L8C23)



## Longitudinal Static Stability (Cont.)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL AT TRANSONIC SPEEDS AS OBTAINED BY THE TRANSONIC-BUMP METHOD. Joseph Weil and M. Leroy Spearman. July 19, 1948. 23p. diagrs., tab. (NACA RM L8B03)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEEPBACK WING AND TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. Richard H. Sawyer and Lindsay J. Lina. July 23, 1948. 42p. diagrs., photos., tab. (NACA RM L8B19)

EFFECT OF DOWNWASH ON THE ESTIMATED ELEVATOR DEFLECTION REQUIRED FOR TRIM OF THE XS-1 AIRPLANE AT SUPERSONIC SPEEDS. James T. Matthews, Jr. November 1, 1948. 11p. diagrs. (NACA RM L8H06a)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE - DYNAMIC PRESSURE AND COMPARISON OF POINT AND EFFECTIVE DOWNWASH AT THE TAIL OF THE D-558-1. Harold L. Robinson. November 4, 1948. 27p. diagrs. (NACA RM L8H05)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN MODEL OF A SUPERSONIC AIRPLANE CONFIGURATION AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Norman S. Silsby and James M. McKay. November 8, 1948. 30p. diagrs., photos., tab. (NACA RM L8G30)

DETERMINATION BY THE FREE-FALL METHOD OF THE LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE MODEL OF THE BELL XS-1 AIRPLANE AT TRANSONIC SPEEDS. James T. Matthews, Jr. and Charles W. Mathews. November 9, 1948. 19p. diagrs., photo., tab. (NACA RM L8G29a)

AERODYNAMIC CHARACTERISTICS AT SUBSONIC AND TRANSONIC SPEEDS OF A 42.7° SWEEPBACK WING MODEL HAVING AN ALERON WITH FINITE TRAILING-EDGE THICKNESS. Thomas R. Turner, Vernard E. Lockwood and Raymond D. Vogler. January 12, 1949. 24p. diagrs., photo. (NACA RM L8K02)

INVESTIGATION OF DOWNWASH AND WAKE CHARACTERISTICS AT A MACH NUMBER OF 1.53. II - TRIANGULAR WING. Edward W. Perkins and Thomas N. Canning. June 6, 1949. 31p. diagrs. (NACA RM A9D20)

RESULTS OBTAINED FROM SECOND FLIGHT OF X-4 AIRPLANE (A.F. NO. 46-676). Walter C. Williams. July 18, 1949. 13p. diagrs., photos., tab. (NACA RM L9F21)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 4, TAPER RATIO 0.3, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and Thomas J. King, Jr. July 20, 1949. 28p. diagrs., photo., tab. (NACA RM L9E25)

STABILITY AND CONTROL DATA OBTAINED FROM FOURTH AND FIFTH FLIGHTS OF THE NORTHROP X-4 AIRPLANE (A.F. NO. 46-676). George M. Valentine. August 4, 1949. 22p. diagrs., photos., tab. (NACA RM L9G25a)

EFFECT OF SWEEPBACK ON THE LOW-SPEED STATIC AND ROLLING STABILITY DERIVATIVES OF THIN TAPERED WINGS OF ASPECT RATIO 4. William Letko and Walter D. Wolhart. August 9, 1949. 36p. diagrs., photo. (NACA RM L9F14)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Raymond D. Vogler. August 15, 1949. 22p. diagrs. (NACA RM L9F29a)

AERODYNAMIC CHARACTERISTICS OF A DELTA WING WITH LEADING EDGE SWEEP BACK 45°, ASPECT RATIO 4, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and Robert E. Becht. September 6, 1949. 29p. diagrs., photo., tab. (NACA RM L9G22a)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 60°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Thomas J. King, Jr. and Boyd C. Myers, II. September 6, 1949. 32p. diagrs., photos., tab. (NACA RM L9G27)

RESULTS OBTAINED FROM THIRD FLIGHT OF NORTHROP X-4 AIRPLANE (A.F. NO. 46-676). Walter C. Williams. September 9, 1949. 13p. diagrs., photos., tab. (NACA RM L9G20a)

PRELIMINARY WIND-TUNNEL INVESTIGATION AT HIGH-SUBSONIC SPEEDS OF PLANING-TAIL, BLENDED, AND AIRFOIL-FOREBODY SWEEP HULLS. John M. Riebe and Richard G. MacLeod. September 12, 1949. 33p. diagrs., photos., 3 tabs. (NACA RM L9D01)

AERODYNAMIC CHARACTERISTICS OF A WING WITH UNSWEEP QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth W. Goodson and William D. Morrison, Jr. October 21, 1949. 32p. diagrs., photos., tab. (NACA RM L9H22)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth W. Goodson and Albert G. Few, Jr. November 1, 1949. 34p. diagrs., photos., tab. (NACA RM L9I08)

DOWNWASH IN VORTEX REGION BEHIND TRAPEZOIDAL-WING TIP AT MACH NUMBER 1.91. J. L. Cummings, H. Mirels and L. E. Baughman. November 10, 1949. 39p. diagrs., photos. (NACA RM E9H15)

EFFECT OF AIRFOIL SECTION AND TIP TANKS ON THE AERODYNAMIC CHARACTERISTICS AT HIGH SUBSONIC SPEEDS OF AN UNSWEEP WING OF ASPECT RATIO 5.16 AND TAPER RATIO 0.61. H. Norman Silvers and Kenneth P. Spreemann. December 1, 1949. 30p. diagrs., photos., 2 tabs. (NACA RM L9J04)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK 35°, ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. William C. Sleeman, Jr. and William D. Morrison, Jr. December 12, 1949. 32p. diagrs., photos., tab. (NACA RM L9K10a)



### Longitudinal Static Stability (Cont.)

RESULTS OBTAINED DURING FLIGHTS 1 TO 6 OF THE NORTHROP X-4 AIRPLANE. (A.F. NO. 46-677). James T. Matthews, Jr. January 12, 1950. 19p. diags., photos., tab. (NACA RM L9K22)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK  $35^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Robert F. Thompson. January 25, 1950. 22p. diags., tab. (NACA RM L9L12a)

MAXIMUM-LIFT INVESTIGATION AT MACH NUMBERS FROM 0.05 TO 1.20 OF A WING WITH LEADING EDGE SWEEP BACK  $42^\circ$ . Thomas R. Turner. February 14, 1950. 21p. diags. (NACA RM L9K03)

SPIN-TUNNEL INVESTIGATION OF A MODEL OF A  $60^\circ$  DELTA-WING AIRPLANE TO DETERMINE THE SPIN, RECOVERY, AND LONGITUDINAL TRIM CHARACTERISTICS THROUGHOUT AN EXTENSIVE RANGE OF MASS LOADINGS. Walter J. Kliner and Ira P. Jones, Jr. February 15, 1950. 56p. diags., photos., 6 charts, 4 tabs. (NACA RM L9L06)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $60^\circ$ , ASPECT RATIO 2, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and Thomas J. King, Jr. February 24, 1950. 31p. diags., photos., tab. (NACA RM L50A12)

STALL CHARACTERISTICS OBTAINED FROM FLIGHT 10 OF NORTHROP X-4 NO. 2 AIRPLANE (USAF NO. 46-677). Melvin Sadoff and Thomas R. Sisk. February 27, 1950. 25p. diags., photos., tab. (NACA RM A50A04)

AERODYNAMIC INVESTIGATION AT MACH NUMBER 1.92 OF A RECTANGULAR WING AND TAIL AND BODY CONFIGURATION AND ITS COMPONENTS. Macon C. Ellis, Jr. and Carl E. Grigsby. March 1, 1950. 96p. diags., photos., 4 tabs. (NACA RM L9L28a)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK  $60^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Raymond D. Vogler. March 2, 1950. 21p. diags. (NACA RM L50A17)

AERODYNAMIC CHARACTERISTICS OF A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 2, TAPER RATIO 0.78, AND NACA 65A004 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Edward C. Polhamus and George S. Campbell. March 8, 1950. 17p. diags., photos., tab. (NACA RM L50A18)

EXPLORATORY INVESTIGATION OF LEADING-EDGE CHORD-EXTENSIONS TO IMPROVE THE LONGITUDINAL STABILITY CHARACTERISTICS OF TWO  $52^\circ$  SWEEPBACK WINGS. G. Chester Furlong. March 10, 1950. 32p. diags., photo. (NACA RM L50A30)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LONGITUDINAL STABILITY AND CONTROL. William B. Kemp, Jr. Robert E. Becht and Albert G. Few, Jr. March 14, 1950. 51p. diags., photos. (NACA RM L9K08)

INVESTIGATION AT HIGH SUBSONIC SPEEDS OF A  $45^\circ$  SWEEPBACK HORIZONTAL TAIL WITH PLAIN AND HORN-BALANCED CONTROL SURFACES. Harold S. Johnson and Robert F. Thompson. March 31, 1950. 44p. diags., photo., tab. (NACA RM L50B13)

AERODYNAMIC CHARACTERISTICS OF A WING WITH QUARTER-CHORD LINE SWEEP BACK  $45^\circ$ , ASPECT RATIO 6, TAPER RATIO 0.6, AND NACA 65A009 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Kenneth P. Spreemann, William D. Morrison, Jr. and Thomas B. Pasteur, Jr. April 6, 1950. 33p. diags., photos., tab. (NACA RM L50B03a)

MAXIMUM-LIFT INVESTIGATION OF A 1/40-SCALE X-1 AIRPLANE WING AT MACH NUMBERS FROM 0.60 TO 1.15. Thomas R. Turner. April 21, 1950. 18p. diags. (NACA RM L50C28)

AERODYNAMIC CHARACTERISTICS WITH FIXED AND FREE TRANSITION OF A MODIFIED DELTA WING IN COMBINATION WITH A FUSELAGE AT HIGH SUBSONIC SPEEDS. Edward C. Polhamus and Thomas J. King, Jr. May 2, 1950. 19p. diags., photos. (NACA RM L50C21)

AERODYNAMIC AND LATERAL-CONTROL CHARACTERISTICS OF A 1/28-SCALE MODEL OF THE BELL X-1 AIRPLANE WING-FUSELAGE COMBINATION. TRANSONIC-BUMP METHOD. Vernard E. Lockwood. May 5, 1950. 28p. diags., tab. (NACA RM L50C22)

AERODYNAMIC CHARACTERISTICS OF A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A004 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Boyd C. Myers, II and James W. Wiggins. May 8, 1950. 31p. diags., photos., tab. (NACA RM L50C16)

WIND-TUNNEL INVESTIGATION AT LOW SPEED TO DETERMINE AERODYNAMIC PROPERTIES OF A JETTISONABLE NOSE SECTION WITH CIRCULAR CROSS SECTION. Roscoe H. Goodwin. May 19, 1950. 38p. diags., photos. (NACA RM L9J13)

LONGITUDINAL-STABILITY CHARACTERISTICS OF THE NORTHROP X-4 AIRPLANE (USAF NO. 46-677). Melvin Sadoff and Thomas R. Sisk. June 29, 1950. 24p. diags., photos., tab. (NACA RM A50D27)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE AND SPOILER-TYPE CONTROLS ON A WING WITH QUARTER-CHORD-LINE SWEEPBACK OF  $60^\circ$ , ASPECT RATIO 2, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Alexander D. Hammond. July 18, 1950. 26p. diags. (NACA RM L50E09)

STABILITY CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL WITH VARIOUS MODIFICATIONS TO THE BASIC MODEL CONFIGURATIONS. Robert E. Becht and Albert G. Few, Jr. August 16, 1950. 47p. diags., photo. (NACA RM L50F23)

WING-FLOW MEASUREMENTS OF LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A CANARD AIRPLANE CONFIGURATION WITH A  $45^\circ$  SWEEPBACK WING AND A TRIANGULAR ALL-MOVABLE CONTROL SURFACE. Harold L. Crane and James J. Adams. August 25, 1950. 53p. diags., photo. (NACA RM L50A31)

LOW-SPEED STATIC STABILITY CHARACTERISTICS OF A CANARD MODEL WITH A  $45^\circ$  SWEEPBACK WING AND A  $60^\circ$  TRIANGULAR HORIZONTAL CONTROL SURFACE. John W. Draper. September 6, 1950. 43p. diags., photo., 2 tabs. (NACA RM L50G11)



## Longitudinal Static Stability (Cont.)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LONGITUDINAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. September 8, 1950. 80p. diagrs., photos., 2 tabs. (NACA RM A50G06)

INVESTIGATION AT TRANSONIC SPEEDS OF A 35-PERCENT-CHORD AILERON ON A TAPERED WEDGE-TYPE WING OF ASPECT RATIO 2.5 WITH AND WITHOUT A FUSELAGE. Thomas R. Turner and Joseph E. Fikes. September 8, 1950. 25p. diagrs. (NACA RM L50G13a)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS AT HIGH-SUBSONIC SPEEDS OF TWO MODELS OF A TRANSONIC RESEARCH AIRPLANE WITH WINGS AND HORIZONTAL TAILS OF ASPECT RATIOS 4.2 AND 2. Arvo A. Luoma and John B. Wright. September 29, 1950. 134p. diagrs., photos., 3 tabs. (NACA RM L50H07)

EFFECTS OF SWEEP ON THE MAXIMUM-LIFT CHARACTERISTICS OF FOUR ASPECT-RATIO-4 WINGS AT TRANSONIC SPEEDS. Thomas R. Turner. October 3, 1950. 25p. diagrs. (NACA RM L50H11)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.38 OF FOUR WINGS OF ASPECT RATIO 4 HAVING QUARTER-CHORD SWEEP ANGLES OF 0°, 35°, 45°, AND 60°. William B. Kemp, Jr., Kenneth W. Goodson and Robert A. Booth. October 10, 1950. 41p. diagrs., photos., tab. (NACA RM L50G14)

LONGITUDINAL CHARACTERISTICS AT MACH NUMBER OF 1.24 OF 1/30-SCALE SEMISPAN MODEL OF BELL X-5 VARIABLE-SWEEP AIRPLANE WITH WING SWEEP BACK 60° FROM TESTS BY NACA WING-FLOW METHOD. Norman S. Silsby, Garland J. Morris and Robert M. Kennedy. October 12, 1950. 17p. diagrs., photos., tab. (NACA RM L50E02a)

DOWNWASH IN VORTEX REGION BEHIND RECTANGULAR HALF-WING AT MACH NUMBER 1.91. John L. Cummings and Rudolph C. Haefeli. October 26, 1950. 43p. diagrs., photos., tab. (NACA RM E50H10)

THE EFFECT OF SWEEPBACK ON THE LONGITUDINAL CHARACTERISTICS AT A MACH NUMBER OF 1.24 OF A 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 AIRPLANE FROM TESTS BY THE NACA WING-FLOW METHOD. Garland J. Morris, Robert M. Kennedy and Norman S. Silsby. November 27, 1950. 22p. diagrs., photos., tab. (NACA RM L50I28)

LOW-SPEED INVESTIGATION OF THE EFFECT OF SEVERAL FLAP AND SPOILER AILERONS ON THE LATERAL CHARACTERISTICS OF A 47.5° SWEEPBACK-WING - FUSELAGE COMBINATION AT A REYNOLDS NUMBER OF  $4.4 \times 10^6$ . Jerome Pasamanick and Thomas B. Sellers. December 8, 1950. 57p. diagrs., photo. (NACA RM L50J20)

PRELIMINARY FLIGHT INVESTIGATION OF THE DYNAMIC LONGITUDINAL-STABILITY CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE. William C. Triplett and Rudolph D. Van Dyke, Jr. December 11, 1950. 26p. diagrs., photo., tab. (NACA RM A50J09a)

INVESTIGATION OF THE DOWNWASH AND WAKE BEHIND A TRIANGULAR WING OF ASPECT RATIO 4 AT SUBSONIC AND SUPERSONIC MACH NUMBERS. Harold J. Walker and Louis S. Stivers, Jr. December 12, 1950. 32p. diagrs. (NACA RM A50I14a)

SUMMARY REPORT OF RESULTS OBTAINED DURING DEMONSTRATION TESTS OF THE NORTHROP X-4 AIRPLANES. Melvin Sadoff and Thomas R. Sisk. December 13, 1950. 46p. diagrs., photos., tab. (NACA RM A50I01)

STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL IN THE LANDING CONFIGURATION. Robert E. Becht. December 18, 1950. 38p. diagrs., photos. (NACA RM L50J27)

EFFECT OF AN END PLATE ON THE AERODYNAMIC CHARACTERISTICS OF A 20.55° SWEEPBACK WING WITH AN ASPECT RATIO OF 2.67 AND A TAPER RATIO OF 0.5. TRANSONIC-BUMP METHOD. James M. Watson. December 21, 1950. 15p. diagrs., photo. (NACA RM L50H28a)

LONGITUDINAL-CONTROL EFFECTIVENESS AND DOWNWASH CHARACTERISTICS AT A MACH NUMBER OF 1.24 OF A 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 AIRPLANE AS DETERMINED BY THE NACA WING-FLOW METHOD. Richard H. Sawyer, Robert M. Kennedy and Garland J. Morris. January 8, 1951. 37p. diagrs., photos., tab. (NACA RM L50K15)

STATIC LONGITUDINAL STABILITY AND DYNAMIC CHARACTERISTICS AT HIGH ANGLES OF ATTACK AND AT LOW REYNOLDS NUMBERS OF A MODEL OF THE X-3 SUPERSONIC RESEARCH AIRPLANE. Sanger M. Burk, Jr. and Burton E. Hultz. February 6, 1951. 76p. diagrs., photos., 4 tabs. (NACA RM L50L19)

EFFECTS OF A FUSELAGE FLAP DIVE BRAKE ON THE AERODYNAMIC CHARACTERISTICS OF 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 VARIABLE-SWEEP AIRPLANE AT A MACH NUMBER 1.24 AS DETERMINED BY THE NACA WING-FLOW METHOD. Robert M. Kennedy. February 8, 1951. 15p. diagrs., photos., tab. (NACA RM L50L11a)

EXPERIMENTAL DOWNWASH AND WAKE CHARACTERISTICS AT SUBSONIC AND SUPERSONIC MACH NUMBERS BEHIND AN UNSWEPT, TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS. Harold J. Walker, Louis S. Stivers, Jr. and Luther Beard, Jr. April 20, 1951. 43p. diagrs. (NACA RM A51B16)

EFFECT OF A DEFLECTABLE WING-TIP CONTROL ON THE LOW-SPEED LATERAL AND LONGITUDINAL CHARACTERISTICS OF A LARGE-SCALE WING WITH THE LEADING EDGE SWEEP BACK 47.5°. Roy H. Lange and Marvin P. Fink. April 26, 1951. 41p. diagrs., photo., 2 tabs. (NACA RM L51C07)

FLIGHT INVESTIGATION OF THE LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE (BUAERO NO 37972) AT MACH NUMBERS UP TO 0.89. Melvin Sadoff, William S. Roden and John M. Eggleston. June 1951. 26p. diagrs., photos., tab. (NACA RM L51D18)

AERODYNAMIC CHARACTERISTICS OF TAPERED WINGS HAVING ASPECT RATIOS OF 4, 6, AND 8, QUARTER-CHORD LINES SWEEP BACK 45°, AND NACA 631A012 AIRFOIL SECTIONS. TRANSONIC-BUMP METHOD. Edward C. Polhamus and Thomas J. King, Jr. June 13, 1951. 23p. diagrs., photos., 2 tabs. (NACA RM L51C26)

EFFECTS OF SPANWISE THICKNESS VARIATION ON THE AERODYNAMIC CHARACTERISTICS OF 35° AND 45° SWEEPBACK WINGS OF ASPECT RATIO 6. TRANSONIC-BUMP METHOD. William D. Morrison, Jr. and Paul G. Fournier. July 1951. 38p. diagrs., photo. (NACA RM L51D19)



### Longitudinal Static Stability (Cont.)

INVESTIGATION OF A TRIANGULAR WING IN CONJUNCTION WITH A FUSELAGE AND HORIZONTAL TAIL TO DETERMINE DOWNWASH AND LONGITUDINAL STABILITY CHARACTERISTICS - TRANSONIC BUMP METHOD. Edwin C. Allen. August 1951. 22p. diagrs., photos. (NACA RM A51F12a)

SMALL-SCALE INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECTS OF THICKENING THE INBOARD SECTION OF A 45° SWEEPBACK WING OF ASPECT RATIO 4, TAPER RATIO 0.3, AND NACA 65A006 AIRFOIL SECTION. Kenneth P. Spreemann and William J. Alford, Jr. August 1951. 21p. diagrs., photo. (NACA RM L51F08a)

A METHOD FOR THE DESIGN OF SWEEPBACK WINGS WARPED TO PRODUCE SPECIFIED FLIGHT CHARACTERISTICS AT SUPERSONIC SPEEDS. Warren A. Tucker. September 1951. 52p. diagrs., 2 tabs. (NACA RM L51F08)

MEASUREMENTS IN FLIGHT OF THE LONGITUDINAL CHARACTERISTICS OF TWO JET AIRCRAFT, ONE WITH A DIVING TENDENCY AND THE OTHER WITH A CLIMBING TENDENCY AT HIGH MACH NUMBERS. Seth B. Anderson. October 1951. 18p. diagrs., photos., 2 tabs. (NACA RM A51E14)

A FLIGHT EVALUATION OF THE LONGITUDINAL STABILITY CHARACTERISTICS ASSOCIATED WITH THE PITCH-UP OF A SWEEP-WING AIRPLANE IN MANEUVERING FLIGHT AT TRANSONIC SPEEDS. Seth B. Anderson and Richard S. Bray. November 1951. 33p. diagrs., photo., tab. (NACA RM A51I12)

AERODYNAMIC CHARACTERISTICS OF A LEADING-EDGE SLAT ON A 35° SWEEP-BACK WING FOR MACH NUMBERS FROM 0.30 TO 0.88. John A. Kelly and Nora-Lee F. Hayter. December 1951. 49p. diagrs., tab. (NACA RM A51H23)

EFFECTS OF HORIZONTAL-TAIL POSITION, AREA, AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 60° TRIANGULAR-WING MODEL HAVING VARIOUS TRIANGULAR-ALL-MOVABLE HORIZONTAL TAILS. Byron M. Jaquet. December 1951. 61p. diagrs., photo., tab. (NACA RM L51I06)

INVESTIGATION OF THE DISTRIBUTION OF LIFT, DRAG, AND PITCHING MOMENT BETWEEN THE WING AND FUSELAGE OF A 1/30-SCALE SEMI-SPAN MODEL OF THE BELL X-5 AIRPLANE AT A MACH NUMBER OF 1.24 BY THE NACA WING-FLOW METHOD. Norman S. Silsby and Garland J. Morris. January 1952. 32p. diagrs., photos., tab. (NACA RM L51K27)

THE EFFECTIVENESS OF WING VORTEX GENERATORS IN IMPROVING THE MANEUVERING CHARACTERISTICS OF A SWEEP-WING AIRPLANE AT TRANSONIC SPEEDS. Norman M. McFadden, George A. Rathert, Jr. and Richard S. Bray. February 1952. 45p. photos., diagrs., tab. (NACA RM A51J18)

LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF 60° TRIANGULAR-WING AND MODIFIED 60° TRIANGULAR-WING MODELS HAVING HALF-DELTA AND HALF-DIAMOND TIP CONTROLS. Jacob H. Lichtenstein and Byron M. Jaquet. February 1952. 36p. diagrs., photos., tab. (NACA RM L51K08)

WIND-TUNNEL INVESTIGATION AT HIGH AND LOW SUBSONIC MACH NUMBERS OF A THIN SWEEPBACK WING HAVING AN AIRFOIL SECTION DESIGNED FOR HIGH MAXIMUM LIFT. Stanley F. Racisz and Nicholas J. Paradiso. February 1952. 46p. diagrs., photo., tab. (NACA RM L51L04)

FULL-SCALE WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF WING MODIFICATIONS AND HORIZONTAL-TAIL LOCATION ON THE LOW-SPEED STATIC LONGITUDINAL CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE. Ralph L. Maki. April 1952. 54p. diagrs., photos., 7 tabs. (NACA RM A52B05)

LOW-SPEED STABILITY CHARACTERISTICS OF A COMPLETE MODEL WITH A WING OF W PLAN FORM. Edward C. Polhamus and Robert E. Becht. April 1952. 27p. diagrs., photo., tab. (NACA RM L52A25)

EFFECTS OF HORIZONTAL-TAIL POSITION AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 60° TRIANGULAR-WING MODEL HAVING TWIN TRIANGULAR ALL-MOVABLE TAILS. Byron M. Jaquet. May 1952. 45p. diagrs., photos. (NACA RM L52B25)

AN INVESTIGATION OF LONGITUDINAL CONTROL CHARACTERISTICS OF A WING-TIP CONTROL SURFACE ON A SWEEPBACK WING AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. James P. Trant, Jr. June 1952. 23p. diagrs., photos., tab. (NACA RM L52B15a)

SMALL-SCALE TRANSONIC INVESTIGATION OF THE EFFECTS OF PARTIAL-SPAN LEADING-EDGE CAMBER ON THE AERODYNAMIC CHARACTERISTICS OF A 50° 38' SWEEPBACK WING OF ASPECT RATIO 2.98. William J. Alford, Jr. and Andrew L. Byrnes, Jr. June 1952. 28p. diagrs., photo., tab. (NACA RM L52D08a)

AN INVESTIGATION OF THE LOW-SPEED LONGITUDINAL STABILITY CHARACTERISTICS OF A SWEEP-WING AIRPLANE MODEL WITH TWO MODIFICATIONS TO THE WING-ROOT PLAN FORM. William B. Kemp, Jr. July 1952. 17p. diagrs., tab. (NACA RM L52E07)

SMALL-SCALE TRANSONIC INVESTIGATION OF THE EFFECTS OF FULL-SPAN AND PARTIAL-SPAN LEADING-EDGE FLAPS ON THE AERODYNAMIC CHARACTERISTICS OF A 50° 38' SWEEPBACK WING OF ASPECT RATIO 2.98. Kenneth P. Spreemann and William J. Alford, Jr. July 1952. 31p. diagrs., photo. (NACA RM L52E12)

THE CALCULATION OF CERTAIN STATIC AEROELASTIC PHENOMENA OF WINGS WITH TIP TANKS OR BOOM-MOUNTED LIFTING SURFACES. Franklin W. Diederich and Kenneth A. Foss. August 1952. 55p. diagrs., 2 tabs. (NACA RM L52A22)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A 60° DELTA WING EQUIPPED WITH A CONSTANT-CHORD FLAP-TYPE CONTROL WITH AND WITHOUT AN UNSHIELDED HORN BALANCE. TRANSONIC-BUMP METHOD. Harleth G. Wiley and Leon Zontek. September 1952. 25p. diagrs. (NACA RM L51H22)

AN APPLICATION OF THE ROCKET-PROPELLED-MODEL TECHNIQUE TO THE INVESTIGATION OF LOW-LIFT BUFFETING AND THE RESULTS OF PRELIMINARY TESTS. Homer P. Mason and William N. Gardner. September 1952. 19p. diagrs., photos. (NACA RM L52C27)

AN ANALYSIS OF ESTIMATED AND EXPERIMENTAL TRANSONIC DOWNWASH CHARACTERISTICS AS AFFECTED BY PLAN FORM AND THICKNESS FOR WING AND WING-FUSELAGE CONFIGURATIONS. Joseph Weil, George S. Campbell and Margaret S. Diederich. November 1952. 92p. diagrs., 2 tabs. (NACA RM L52I22)



## Longitudinal Static Stability (Cont.)

CORRELATION OF BUFFET BOUNDARIES PREDICTED FROM WIND-TUNNEL TESTS WITH THOSE MEASURED DURING FLIGHT TESTS ON THE F8F-1 AND X-1 AIRPLANES - TRANSONIC-BUMP METHOD. Andrew Martin and James F. Reed. December 1952. 22p. diagrs., photos., tab. (NACA RM A52J17)

CHARACTERISTICS OF FLAP-TYPE SPOILER AILERONS AT VARIOUS LOCATIONS ON A 60° DELTA WING WITH A DOUBLE SLOTTED FLAP. Delwin R. Croom. December 1952. 31p. diagrs., 3 tabs. (NACA RM L52J24)

AERODYNAMIC CHARACTERISTICS OF A REFINED DEEP-STEP PLANING-TAIL FLYING-BOAT HULL WITH VARIOUS FOREBODY AND AFTERBODY SHAPES. John M. Riebe and Rodger L. Naeseth. 1953. ii, 19p. diagrs., photos., 8 tabs. (NACA Rept. 1144. Formerly TN 2489; RM L8F01)

A STUDY OF THE USE OF VARIOUS HIGH-LIFT DEVICES ON THE HORIZONTAL TAIL OF A CANARD AIRPLANE MODEL AS A MEANS OF INCREASING THE ALLOWABLE CENTER-OF-GRAVITY TRAVEL. Joseph L. Johnson, Jr. January 1953. 25p. diagrs., 2 tabs. (NACA RM L52K18a)

FREE-FLIGHT-TUNNEL INVESTIGATION OF THE LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A MODEL HAVING A FUSELAGE OR RELATIVELY FLAT CROSS SECTION. John W. Paulson and Joseph L. Johnson, Jr. February 1953. 30p. diagrs., photo., tab. (NACA RM L52L22)

INVESTIGATION OF THREE TAPERED 45° SWEEPBACK CAMBERED AND TWISTED WINGS COVERING A SIMULTANEOUS VARIATION IN ASPECT RATIO AND THICKNESS RATIO AND OF ONE RELATED SYMMETRICAL WING AT TRANSONIC SPEEDS BY THE WING-FLOW METHOD. Harold I. Johnson. March 1953. 55p. diagrs., photos., 2 tabs. (NACA RM L52H07)

TRANSONIC AERODYNAMIC CHARACTERISTICS OF AN NACA 64A006 AIRFOIL SECTION WITH A 15-PERCENT-CHORD LEADING-EDGE FLAP. Milton D. Humphreys. September 1953. 44p. diagrs., photos. (NACA RM L53G23)

INVESTIGATION OF LIFT, DRAG, AND PITCHING MOMENT OF A 60° DELTA-WING-BODY COMBINATION (AGARD CALIBRATION MODEL B) IN THE LANGLEY 9-INCH SUPERSONIC TUNNEL. August F. Bromm, Jr. September 1954. 18p. diagrs., photos. (NACA TN 3300)

INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A MODEL WING-PROPELLER COMBINATION AND OF THE WING AND PROPELLER SEPARATELY AT ANGLES OF ATTACK UP TO 90°. John W. Draper and Richard E. Kuhn. November 1954. 72p. diagrs., photos., tab. (NACA TN 3304)

AN INVESTIGATION OF A WING-PROPELLER CONFIGURATION EMPLOYING LARGE-CHORD PLAIN FLAPS AND LARGE-DIAMETER PROPELLERS FOR LOW-SPEED FLIGHT AND VERTICAL TAKE-OFF. Richard E. Kuhn and John W. Draper. December 1954. 94p. diagrs., photos. (NACA TN 3307)

PREDICTION OF DOWNWASH BEHIND SWEEP-WING AIRPLANES AT SUBSONIC SPEED. John DeYoung and Walter H. Barling, Jr. January 1955. 104p. diagrs., 3 tabs. (NACA TN 3346)

SOME EFFECTS OF PROPELLER OPERATION AND LOCATION ON ABILITY OF A WING WITH PLAIN FLAPS TO DEFLECT PROPELLER SLIPSTREAMS DOWNWARD FOR VERTICAL TAKE-OFF. John W. Draper and Richard E. Kuhn. January 1955. 28p. diagrs., photo. (NACA TN 3360)

INVESTIGATION OF EFFECTIVENESS OF LARGE-CHORD SLOTTED FLAPS IN DEFLECTING PROPELLER SLIPSTREAMS DOWNWARD FOR VERTICAL TAKE-OFF AND LOW-SPEED FLIGHT. Richard E. Kuhn and John W. Draper. January 1955. 42p. diagrs., photo., tab. (NACA TN 3364)

STATIC STABILITY OF FUSELAGES HAVING A RELATIVELY FLAT CROSS SECTION. William R. Bates. March 1955. 29p. diagrs., tab. (NACA TN 3429. Formerly RM L9106a)

## Lateral (1.8.1.1.2)

FACTORS AFFECTING LATERAL STABILITY AND CONTROLLABILITY. John P. Campbell and Thomas A. Toll. May 13, 1948. 19p. diagrs. (NACA RM L8A28a)

AN INVESTIGATION OF THE LOW-SPEED STATIC STABILITY CHARACTERISTICS OF COMPLETE MODELS HAVING SWEPTBACK AND SWEEP FORWARD WINGS. M. Leroy Spearman and Paul Comisarow. November 19, 1948. 51p. diagrs., tab. photos. (NACA RM L8H31)

THEORETICAL INVESTIGATION OF THE DYNAMIC LATERAL STABILITY CHARACTERISTICS OF DOUGLAS DESIGN NO. 39C, AN EARLY VERSION OF THE X-3 RESEARCH AIRPLANE. Charles V. Bennett. January 18, 1949. 39p. diagrs., 2 tabs. (NACA RM L8L31)

FLIGHT MEASUREMENT OF THE STABILITY CHARACTERISTICS OF THE DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN SIDESLIPS. Walter C. Williams. April 18, 1949. 23p. diagrs., photos. (NACA RM L8E14a)

STABILITY AND CONTROL DATA OBTAINED FROM FOURTH AND FIFTH FLIGHTS OF THE NORTHROP X-4 AIRPLANE (A.F. NO. 46-676). George M. Valentine. August 4, 1949. 22p. diagrs., photos., tab. (NACA RM L9G25a)

EFFECT OF SWEEPBACK ON THE LOW-SPEED STATIC AND ROLLING STABILITY DERIVATIVES OF THIN TAPERED WINGS OF ASPECT RATIO 4. William Letko and Walter D. Wolhart. August 9, 1949. 36p. diagrs., photo. (NACA RM L9F14)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK 45°, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Raymond D. Vogler. August 15, 1949. 22p. diagrs. (NACA RM L9F29a)

INVESTIGATION OF EXTENSIBLE WING-TIP AILERONS ON AN UNTAPERED SEMISPAN WING AT 0° AND 45° SWEEPBACK. John R. Hagerman and William M. O'Hare. September 20, 1949. 40p. diagrs., photo., tab. (NACA RM L9H04)

LOW-SPEED STATIC LATERAL STABILITY CHARACTERISTICS OF A CANARD MODEL HAVING A 60° TRIANGULAR WING AND HORIZONTAL TAIL. William R. Bates. November 23, 1949. 29p. diagrs., tab. (NACA RM L9J12)



AERODYNAMICS  
88 STABILITY AND CONTROL (1.8)

Lateral Static Stability (Cont.)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK  $35^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Robert F. Thompson. January 25, 1950. 22p. diagrs., tab. (NACA RM L9L12a)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK  $60^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Raymond D. Vogler. March 2, 1950. 21p. diagrs. (NACA RM L50A17)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LATERAL AND DIRECTIONAL STABILITY AND CONTROL. William B. Kemp, Jr. and Robert E. Becht. June 20, 1950. 97p. diagrs., photos. (NACA RM L50C17a)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE AND SPOILER-TYPE CONTROLS ON A WING WITH QUARTER-CHORD-LINE SWEEPBACK OF  $60^\circ$ , ASPECT RATIO 2, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Alexander D. Hammond. July 18, 1950. 26p. diagrs. (NACA RM L50E09)

STABILITY CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL WITH VARIOUS MODIFICATIONS TO THE BASIC MODEL CONFIGURATIONS. Robert E. Becht and Albert G. Few, Jr. August 16, 1950. 47p. diagrs., photo. (NACA RM L50F23)

LOW-SPEED STATIC STABILITY CHARACTERISTICS OF A CANARD MODEL WITH A  $45^\circ$  SWEEPBACK WING AND A  $60^\circ$  TRIANGULAR HORIZONTAL CONTROL SURFACE. John W. Draper. September 6, 1950. 43p. diagrs., photo., 2 tabs. (NACA RM L50G11)

PRELIMINARY FLIGHT INVESTIGATION OF THE WING-DROPPING TENDENCY AND LATERAL-CONTROL CHARACTERISTICS OF A  $35^\circ$  SWEEP-WING AIRPLANE AT TRANSONIC MACH NUMBERS. George A. Rathert, Jr., L. Stewart Rolis, Lee Winograd and George E. Cooper. September 11, 1950. 14p. diagrs., photo., tab. (NACA RM A50H03)

DAMPING IN YAW AND STATIC DIRECTIONAL STABILITY OF A CANARD AIRPLANE MODEL AND OF SEVERAL MODELS HAVING FUSELAGES OF RELATIVELY FLAT CROSS SECTION. Joseph L. Johnson. October 16, 1950. 20p. diagrs., tab. (NACA RM L50H30a)

LOW-SPEED INVESTIGATION OF THE EFFECT OF SEVERAL FLAP AND SPOILERAILERONS ON THE LATERAL CHARACTERISTICS OF A  $47.5^\circ$  SWEEPBACK-WING - FUSELAGE COMBINATION AT A REYNOLDS NUMBER OF  $4.4 \times 10^6$ . Jerome Pasamanick and Thomas B. Sellers. December 8, 1950. 57p. diagrs., photo. (NACA RM L50J20)

SUMMARY REPORT OF RESULTS OBTAINED DURING DEMONSTRATION TESTS OF THE NORTHROP X-4 AIRPLANES. Melvin Sadoff and Thomas R. Sisk. December 13, 1950. 46p. diagrs., photos., tab. (NACA RM A50I01)

STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL IN THE LANDING CONFIGURATION. Robert E. Becht. December 18, 1950. 38p. diagrs., photos. (NACA RM L50J27)

THE EFFECT OF MASS DISTRIBUTION ON THE LOW-SPEED DYNAMIC LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A MODEL WITH A  $60^\circ$  TRIANGULAR WING. Joseph L. Johnson. March 9, 1951. 23p. diagrs., 2 tabs. (NACA RM L50K10)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LATERAL AND DIRECTIONAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. March 16, 1951. 56p. diagrs., photos., tab. (RM A51A16)

FLIGHT MEASUREMENTS OF THE WING-DROPPING TENDENCY OF A STRAIGHT-WING JET AIRPLANE AT HIGH SUBSONIC MACH NUMBERS. Seth B. Anderson, Edward A. Ernst and Rudolph D. Van Dyke, Jr. April 24, 1951. 16p. diagrs., photo., tab. (NACA RM A51B28)

STATIC LATERAL STABILITY CHARACTERISTICS OF A 1/10-SCALE MODEL OF THE X-1 AIRPLANE AT HIGH SUBSONIC MACH NUMBERS. Richard E. Kuhn and James W. Wiggins. August 1951. 25p. diagrs., photos. (NACA RM L51F01a)

THE EFFECTIVENESS OF WING VORTEX GENERATORS IN IMPROVING THE MANEUVERING CHARACTERISTICS OF A SWEEP-WING AIRPLANE AT TRANSONIC SPEEDS. Norman M. McFadden, George A. Rathert, Jr. and Richard S. Bray. February 1952. 45p. photos., diagrs., tab. (NACA RM A51J18)

LOW-SPEED STABILITY CHARACTERISTICS OF A COMPLETE MODEL WITH A WING OF W PLAN FORM. Edward C. Polhamus and Robert E. Becht. April 1952. 27p. diagrs., photo., tab. (NACA RM L52A25)

FLIGHT MEASUREMENTS OF THE LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A HIGH-SPEED FIGHTER AIRPLANE. H. L. Crane, A. R. Beckhardt and C. E. Matheny. September 1952. 50p. diagrs., tab. (NACA RM L52B14)

AN APPLICATION OF THE ROCKET-PROPELLED-MODEL TECHNIQUE TO THE INVESTIGATION OF LOW-LIFT BUFFETING AND THE RESULTS OF PRELIMINARY TESTS. Homer P. Mason and William N. Gardner. September 1952. 19p. diagrs., photos. (NACA RM L52C27)

A STUDY OF THE FLOW FIELD BEHIND THE TRIANGULAR HORIZONTAL TAIL OF A CANARD AIRPLANE AT APPROXIMATELY THE VERTICAL-TAIL LOCATION BY MEANS OF A TUFT GRID. Joseph L. Johnson, Jr. October 1952. 18p. diagrs., tab. (NACA RM L52H11)

LATERAL AND DIRECTIONAL DYNAMIC-RESPONSE CHARACTERISTICS OF A  $35^\circ$  SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS. William C. Triplett and Stuart C. Brown. December 1952. 62p. diagrs., photo., 3 tabs. (NACA RM A52I17)

FREE-FLIGHT-TUNNEL INVESTIGATION OF THE LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A MODEL HAVING A FUSELAGE OR RELATIVELY FLAT CROSS SECTION. John W. Paulson and Joseph L. Johnson, Jr. February 1953. 30p. diagrs., photo., tab. (NACA RM L52L22)

EFFECT OF HORIZONTAL-TAIL SPAN AND VERTICAL LOCATION ON THE AERODYNAMIC CHARACTERISTICS OF AN UNSWEPT TAIL ASSEMBLY IN SIDESLIP. Donald R. Riley. 1954. ii, 20p. diagrs., photos., tab. (NACA Rept. 1171. Formerly TN 2907)



## Lateral Static Stability (Cont.)

CALCULATED SUBSONIC SPAN LOADS AND RESULTING STABILITY DERIVATIVES OF UNSWEPT AND 45° SWEPTBACK TAIL SURFACES IN SIDESLIP AND IN STEADY ROLL. M. J. Queijo and Donald R. Riley. October 1954. 110p. diags., 2 tabs. (NACA TN 3245)

STATIC STABILITY OF FUSELAGES HAVING A RELATIVELY FLAT CROSS SECTION. William R. Bates. March 1955. 29p. diags., tab. (NACA TN 3429. Formerly RM L9106a)

## Directional (1.8.1.1.3)

WIND-TUNNEL INVESTIGATION AT A MACH NUMBER OF 1.53 OF AN AIRPLANE WITH A TRIANGULAR WING. Richard Scherrer and William R. Wimbrow. January 23, 1948. 74p. diags., photos., 2 tabs. (NACA RM A7J05)

FACTORS AFFECTING LATERAL STABILITY AND CONTROLLABILITY. John P. Campbell and Thomas A. Toll. May 13, 1948. 19p. diags. (NACA RM L8A28a)

AN INVESTIGATION OF THE LOW-SPEED STATIC STABILITY CHARACTERISTICS OF COMPLETE MODELS HAVING SWEPTBACK AND SWEPT FORWARD WINGS. M. Leroy Spearman and Paul Comisarow. November 19, 1948. 51p. diags., tab. photos. (NACA RM L8H31)

FLIGHT MEASUREMENT OF THE STABILITY CHARACTERISTICS OF THE DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN SIDESLIPS. Walter C. Williams. April 18, 1949. 23p. diags., photos. (NACA RM L8E14a)

STABILITY AND CONTROL DATA OBTAINED FROM FOURTH AND FIFTH FLIGHTS OF THE NORTHROP X-4 AIRPLANE (A.F. NO. 46-676). George M. Valentine. August 4, 1949. 22p. diags., photos., tab. (NACA RM L9G25a)

EFFECT OF SWEEPBACK ON THE LOW-SPEED STATIC AND ROLLING STABILITY DERIVATIVES OF THIN TAPERED WINGS OF ASPECT RATIO 4. William Letko and Walter D. Wolhart. August 9, 1949. 36p. diags., photo. (NACA RM L9F14)

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LOW-SPEED STATIC LATERAL STABILITY CHARACTERISTICS OF A CANARD MODEL HAVING A 60° TRIANGULAR WING AND HORIZONTAL TAIL. William R. Bates. November 23, 1949. 29p. diags., tab. (NACA RM L9J12)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LATERAL AND DIRECTIONAL STABILITY AND CONTROL. William B. Kemp, Jr. and Robert E. Becht. June 20, 1950. 97p. diags., photos. (NACA RM L50C17a)

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STATIC DIRECTIONAL STABILITY OF A TANDEM-HELICOPTER FUSELAGE. Charles C. Smith, Jr. August 9, 1950. 23p. diags., photo. (NACA RM L50F29)

STABILITY CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL WITH VARIOUS MODIFICATIONS TO THE BASIC MODEL CONFIGURATIONS. Robert E. Becht and Albert G. Few, Jr. August 16, 1950. 47p. diags., photo. (NACA RM L50F23)

LOW-SPEED STATIC STABILITY CHARACTERISTICS OF A CANARD MODEL WITH A 45° SWEPTBACK WING AND A 60° TRIANGULAR HORIZONTAL CONTROL SURFACE. John W. Draper. September 6, 1950. 43p. diags., photo., 2 tabs. (NACA RM L50G11)

DAMPING IN YAW AND STATIC DIRECTIONAL STABILITY OF A CANARD AIRPLANE MODEL AND OF SEVERAL MODELS HAVING FUSELAGES OF RELATIVELY FLAT CROSS SECTION. Joseph L. Johnson. October 16, 1950. 20p. diags., tab. (NACA RM L50H30a)

LOW-SPEED INVESTIGATION OF THE EFFECT OF SEVERAL FLAP AND SPOILER AILERONS ON THE LATERAL CHARACTERISTICS OF A 47.5° SWEPTBACK-WING - FUSELAGE COMBINATION AT A REYNOLDS NUMBER OF  $4.4 \times 10^6$ . Jerome Pasamanick and Thomas B. Sellers. December 8, 1950. 57p. diags., photo. (NACA RM L50J20)

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LATERAL AND DIRECTIONAL DYNAMIC-RESPONSE CHARACTERISTICS OF A 35° SWEPT-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS. William C. Triplett and Stuart C. Brown. December 1952. 62p. diags., photo., 3 tabs. (NACA RM A52I17)



## AERODYNAMICS

### 90 STABILITY AND CONTROL (1.8)

#### Directional Static Stability (Cont.)

AERODYNAMIC CHARACTERISTICS OF A REFINED DEEP-STEP PLANING-TAIL FLYING-BOAT HULL WITH VARIOUS FOREBODY AND AFTERBODY SHAPES. John M. Riebe and Rodger L. Naeseth. 1953. ii, 19p. diagrs., photos., 8 tabs. (NACA Rept. 1144. Formerly TN 2489 RM L8F01)

FREE-FLIGHT-TUNNEL INVESTIGATION OF THE LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A MODEL HAVING A FUSELAGE OR RELATIVELY FLAT CROSS SECTION. John W. Paulson and Joseph L. Johnson, Jr. February 1953. 30p. diagrs., photo., tab. (NACA RM L52L22)

WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF VARIOUS DORSAL-FIN AND VERTICAL-TAIL CONFIGURATIONS ON THE DIRECTIONAL STABILITY OF A STREAMLINED BODY OF TRANSONIC SPEEDS. TRANSONIC-BUMP METHOD. Harold S. Johnson and William C. Hayes. April 1953. 22p. diagrs., photo., tab. (NACA RM L53B19)

EFFECT OF LAG OF SIDEWASH ON THE VERTICAL-TAIL CONTRIBUTION TO OSCILLATORY DAMPING IN YAW OF AIRPLANE MODELS. Lewis R. Fisher and Herman S. Fletcher. January 1955. 38p. diagrs., photos. (NACA TN 3356)

STATIC STABILITY OF FUSELAGES HAVING A RELATIVELY FLAT CROSS SECTION. William R. Bates. March 1955. 29p. diagrs., tab. (NACA TN 3429. Formerly RM L9I06a)

#### DYNAMIC (1.8.1.2)

LABORATORY INVESTIGATION OF AN AUTOPILOT UTILIZING A MECHANICAL LINKAGE WITH A DEAD SPOT TO OBTAIN AN EFFECTIVE RATE SIGNAL. Ernest C. Seaberg. August 17, 1949. 29p. diagrs., photos., tab. (NACA RM L9F15a)

A THEORETICAL INVESTIGATION OF THE INFLUENCE OF AUXILIARY DAMPING IN PITCH ON THE DYNAMIC CHARACTERISTICS OF A PROPORTIONALLY CONTROLLED SUPERSONIC CANARD MISSILE CONFIGURATION. Walter C. Nelson and Anthony L. Passera. August 25, 1950. 46p. diagrs., photo., 3 tabs. (NACA RM L50F30)

EFFECT OF DIHEDRAL CHANGE ON THE THEORETICAL DYNAMIC LATERAL RESPONSE CHARACTERISTICS OF A LOW-ASPECT-RATIO STRAIGHT-WING SUPERSONIC AIRPLANE. Donovan R. Heinle. December 7, 1950. 35p. diagrs., 2 tabs. (NACA RM A50H02)

STATIC LONGITUDINAL STABILITY AND DYNAMIC CHARACTERISTICS AT HIGH ANGLES OF ATTACK AND AT LOW REYNOLDS NUMBERS OF A MODEL OF THE X-3 SUPERSONIC RESEARCH AIRPLANE. Sanger M. Burk, Jr. and Burton E. Hultz. February 6, 1951. 76p. diagrs., photos., 4 tabs. (NACA RM L50L19)

THEORETICAL INVESTIGATION OF AN AUTOMATIC CONTROL SYSTEM WITH PRIMARY SENSITIVITY TO NORMAL ACCELERATIONS AS USED TO CONTROL A SUPERSONIC CANARD MISSILE CONFIGURATION. Ernest C. Seaberg and Earl F. Smith. July 1951. 48p. diagrs., photo., 3 tabs. (NACA RM L51D23)

STABILITY AND CONTROL MEASUREMENTS OBTAINED DURING USAF-NACA COOPERATIVE FLIGHT-TEST PROGRAM ON THE X-4 AIRPLANE (USAF NO. 46-677). Melvin Sadoff, Herman O. Ankenbruck and William O'Hare. October 1951. 38p. diagrs., photos., tab. (NACA RM A51H09)

A THEORETICAL INVESTIGATION OF THE INFLUENCE OF AUTOPILOT NATURAL FREQUENCY UPON THE DYNAMIC PERFORMANCE CHARACTERISTICS OF A SUPERSONIC CANARD MISSILE CONFIGURATION WITH A PITCH-ATTITUDE CONTROL SYSTEM. Anthony L. Passera. October 1951. 32p. diagrs., photos., 2 tabs. (NACA RM L51H02)

LONGITUDINAL FREQUENCY-RESPONSE CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE AS DETERMINED FROM EXPERIMENTAL TRANSIENT-RESPONSE HISTORIES TO A MACH NUMBER OF 0.90. Ellwyn E. Angle and Euclid C. Holleman. February 1952. 28p. diagrs., tab. (NACA RM L51K28)

A THEORETICAL INVESTIGATION OF THE EFFECT OF A TARGET SEEKER SENSITIVE TO PITCH ATTITUDE ON THE DYNAMIC STABILITY AND RESPONSE CHARACTERISTICS OF A SUPERSONIC CANARD MISSILE CONFIGURATION. Ordway B. Gates, Jr. and Albert A. Schy. August 1952. 54p. diagrs., photo., tab. (NACA RM L52E19)

PRELIMINARY EXPERIMENTAL INVESTIGATION OF THE FLIGHT OF A PERSON SUPPORTED BY A JET THRUST DEVICE ATTACHED TO HIS FEET. C. H. Zimmerman, Paul R. Hill and T. L. Kennedy. January 1953. 31p. diagrs., photos., 2 tabs. (NACA RM L52D10)

THE EFFECT OF CONTROL-SURFACE-SERVO NATURAL FREQUENCY ON THE DYNAMIC PERFORMANCE CHARACTERISTICS OF AN ACCELERATION CONTROL SYSTEM APPLIED TO A SUPERSONIC MISSILE. Anthony L. Passera and Martin L. Nason. September 1953. 28p. diagrs., 3 tabs. (NACA RM L53G23a)

DYNAMIC STABILITY AND CONTROL CHARACTERISTICS OF A CASCADE-WING VERTICALLY RISING AIRPLANE MODEL IN TAKE-OFFS, LANDINGS, AND HOVERING FLIGHT. Marion O. McKinney, Louis P. Tosti and Edwin E. Davenport. June 1954. 45p. diagrs., photos., tab. (NACA TN 3198)

AERODYNAMIC FORCES, MOMENTS, AND STABILITY DERIVATIVES FOR SLENDER BODIES OF GENERAL CROSS SECTION. Alvin H. Sacks. November 1954.(i), 74p. diagrs., 2 tabs. (NACA TN 3283)

ON THE ANALYSIS OF LINEAR AND NONLINEAR DYNAMICAL SYSTEMS FROM TRANSIENT-RESPONSE DATA. Marvin Shinbrot. December 1954. 51p. diagrs., 6 tabs. (NACA TN 3288)

THE LINEARIZED EQUATIONS OF MOTION UNDERLYING THE DYNAMIC STABILITY OF AIRCRAFT, SPINNING PROJECTILES, AND SYMMETRICAL MISSILES. A. C. Charters. January 1955. 102p. diagrs. (NACA TN 3350)

FLIGHT TESTING BY RADIO REMOTE CONTROL - FLIGHT EVALUATION OF A BEEP-CONTROL SYSTEM. Howard L. Turner, John S. White and Rudolph D. Van Dyke, Jr. March 1955. 55p. diagrs., photos., tab. (NACA TN 3496. Formerly RM A52A29)

THEORETICAL INVESTIGATION OF A PROPORTIONAL-PLUS-FLICKER AUTOMATIC PILOT. Ernest C. Seaberg. May 1955. 53p. diagrs., photo., tab. (NACA TN 3427. Formerly RM L50I19)

HOVERING FLIGHT TESTS OF A FOUR-ENGINE-TRANSPORT VERTICAL TAKE-OFF AIRPLANE MODEL UTILIZING A LARGE FLAP AND EXTENSIBLE VANES FOR REDIRECTING THE PROPELLER SLIPSTREAM. Louis P. Tosti and Edwin E. Davenport. May 1955. 26p. diagrs., photos., tab. (NACA TN 3440)



## Longitudinal (1.8.1.2.1)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEEP-BACK TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. John A. Zaloveck and Richard H. Sawyer. March 28, 1947. 30p. diags., photos., tab. (NACA RM L6K21)

AN ANALYSIS OF LONGITUDINAL-CONTROL PROBLEMS ENCOUNTERED IN FLIGHT AT TRANSONIC SPEEDS WITH A JET-PROPELLED AIRPLANE. Harvey H. Brown, L. Stewart Rolls and Lawrence A. Clousing. September 25, 1947. 56p. diags., photos., 3 tabs. (NACA RM A7G03)

GENERAL HANDLING-QUALITIES RESULTS OBTAINED DURING ACCEPTANCE FLIGHT TESTS OF THE BELL XS-1 AIRPLANE. Walter C. Williams, Charles M. Forsyth and Beverly P. Brown. April 19, 1948. 72p. diags., photos., tab. (NACA RM L8A09)

CURRENT STATUS OF LONGITUDINAL STABILITY. Charles J. Donlan. May 24, 1948. 16p. diags. (NACA RM L8A28)

SUMMARY OF RESULTS OF TUMBLING INVESTIGATIONS MADE IN THE LANGLEY 20-FOOT FREE-SPINNING TUNNEL ON 14 DYNAMIC MODELS. Ralph W. Stone, Jr. and Robert L. Bryant. December 31, 1948. 91p. diags., photos., 23 tabs. (NACA RM L8J28)

AN EMPIRICAL CRITERION FOR FIN STABILIZING JETTISONABLE NOSE SECTIONS OF AIRPLANES. Stanley H. Scher. December 8, 1949. 21p. diags., photo., tab. (NACA RM L9I28)

SPIN-TUNNEL INVESTIGATION OF A MODEL OF A 60° DELTA-WING AIRPLANE TO DETERMINE THE SPIN, RECOVERY, AND LONGITUDINAL TRIM CHARACTERISTICS THROUGHOUT AN EXTENSIVE RANGE OF MASS LOADINGS. Walter J. Klinar and Ira P. Jones, Jr. February 15, 1950. 56p. diags., photos., 6 charts, 4 tabs. (NACA RM L9L06)

LONGITUDINAL-STABILITY CHARACTERISTICS OF THE NORTHROP X-4 AIRPLANE (USAF NO. 46-677). Melvin Sadoff and Thomas R. Sisk. June 29, 1950. 24p. diags., photos., tab. (NACA RM A50D27)

PRELIMINARY EMPIRICAL DESIGN REQUIREMENTS FOR THE PREVENTION OF TUMBLING OF AIRPLANES HAVING NO HORIZONTAL TAILS. Robert L. Bryant. October 11, 1950. 23p. diags., 2 tabs. (NACA RM L50H23)

PRELIMINARY FLIGHT INVESTIGATION OF THE DYNAMIC LONGITUDINAL-STABILITY CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE. William C. Triplett and Rudolph D. Van Dyke, Jr. December 11, 1950. 26p. diags., photo., tab. (NACA RM A50J09a)

SUMMARY REPORT OF RESULTS OBTAINED DURING DEMONSTRATION TESTS OF THE NORTHROP X-4 AIRPLANES. Melvin Sadoff and Thomas R. Sisk. December 13, 1950. 46p. diags., photos., tab. (NACA RM A50I01)

THEORETICAL INVESTIGATION OF AN AUTOMATIC CONTROL SYSTEM WITH PRIMARY SENSITIVITY TO NORMAL ACCELERATIONS AS USED TO CONTROL A SUPERSONIC CANARD MISSILE CONFIGURATION. Ernest C. Seaberg and Earl F. Smith. July 1951. 48p. diags., photo., 3 tabs. (NACA RM L51D23)

LONGITUDINAL FREQUENCY-RESPONSE CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS, INCLUDING A METHOD FOR THE EVALUATION OF TRANSFER FUNCTIONS. William C. Triplett and G. Allan Smith. September 1951. 45p. diags., photo. (NACA RM A51G27)

LONGITUDINAL FREQUENCY-RESPONSE CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE AS DETERMINED FROM EXPERIMENTAL TRANSIENT-RESPONSE HISTORIES TO A MACH NUMBER OF 0.90. Ellwyn E. Angle and Euclid C. Holleman. February 1952. 28p. diags., tab. (NACA RM L51K28)

FREE-FLIGHT-TUNNEL INVESTIGATION OF THE LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A MODEL HAVING A FUSELAGE OR RELATIVELY FLAT CROSS SECTION. John W. Paulson and Joseph L. Johnson, Jr. February 1953. 30p. diags., photo., tab. (NACA RM L52L22)

THE EFFECT OF CONTROL-SURFACE-SERVO NATURAL FREQUENCY ON THE DYNAMIC PERFORMANCE CHARACTERISTICS OF AN ACCELERATION CONTROL SYSTEM APPLIED TO A SUPERSONIC MISSILE. Anthony L. Passera and Martin L. Nason. September 1953. 28p. diags., 3 tabs. (NACA RM L53G23a)

MATRIX METHODS FOR DETERMINING THE LONGITUDINAL-STABILITY DERIVATIVES OF AN AIRPLANE FROM TRANSIENT FLIGHT DATA. James J. Donegan. 1954. ii, 20p. diags., 6 tabs. (NACA Rept. 1169. Formerly TN 2902)

AN INVESTIGATION OF THE USE OF ROCKET-POWERED MODELS FOR GUST-LOAD STUDIES WITH AN APPLICATION TO A TAILLESS SWEEP-WING MODEL AT TRANSONIC SPEEDS. A. James Vitale, H. Press and C. C. Shufflebarger. June 1954. 36p. diags., photos., tab. (NACA TN 3161)

SOME MEASUREMENTS OF ATMOSPHERIC TURBULENCE OBTAINED FROM FLOW-DIRECTION VANES MOUNTED ON AN AIRPLANE. Robert G. Chilton. November 1954. 22p. diags., photo., tab. (NACA TN 3313)

A THEORETICAL INVESTIGATION OF THE SHORT-PERIOD DYNAMIC LONGITUDINAL STABILITY OF AIRPLANE CONFIGURATIONS HAVING ELASTIC WINGS OF 0° TO 60° SWEEP-BACK. Milton D. McLaughlin. December 1954. 39p. diags., 2 tabs. (NACA TN 3251)

DESCRIPTION AND ANALYSIS OF A ROCKET-VEHICLE EXPERIMENT ON FLUTTER INVOLVING WING DEFORMATION AND BODY MOTIONS. H. J. Cunningham and R. R. Lundstrom. January 1955. 26p. diags., photos., 2 tabs. (NACA TN 3311. Formerly RM L50I29)

A WIND-TUNNEL TEST TECHNIQUE FOR MEASURING THE DYNAMIC ROTARY STABILITY DERIVATIVES INCLUDING THE CROSS DERIVATIVES AT HIGH MACH NUMBERS. Benjamin H. Beam. January 1955. 35p. diags., photos. (NACA TN 3347)

GROUND-SIMULATOR STUDY OF THE EFFECTS OF STICK FORCE AND DISPLACEMENT ON TRACKING PERFORMANCE. Stanley Faber. April 1955. 21p. diags., photos. (NACA TN 3428)

THEORETICAL INVESTIGATION OF A PROPORTIONAL-PLUS-FLICKER AUTOMATIC PILOT. Ernest C. Seaberg. May 1955. 53p. diags., photo., tab. (NACA TN 3427. Formerly RM L50I19)



# AERODYNAMICS

## 92 STABILITY AND CONTROL (1.8)

### Longitudinal Dynamic Stability

(Cont.)

TOTAL LIFT AND PITCHING MOMENT ON THIN ARROWHEAD WINGS OSCILLATING IN SUPERSONIC POTENTIAL FLOW. H. J. Cunningham. May 1955. 43p. diagrs., 4 tabs. (NACA TN 3433)

### Lateral and Directional

(1.8.1.2.2)

GENERAL HANDLING-QUALITIES RESULTS OBTAINED DURING ACCEPTANCE FLIGHT TESTS OF THE BELL XS-1 AIRPLANE. Walter C. Williams, Charles M. Forsyth and Beverly P. Brown. April 19, 1948. 72p. diagrs., photos., tab. (NACA RM L8A09)

FACTORS AFFECTING LATERAL STABILITY AND CONTROLLABILITY. John P. Campbell and Thomas A. Toll. May 13, 1948. 19p. diagrs. (NACA RM L8A28a)

THEORETICAL ANALYSIS OF THE ROLLING MOTIONS OF AIRCRAFT USING A FLICKER-TYPE AUTOMATIC ROLL STABILIZATION SYSTEM HAVING A DISPLACEMENT-PLUS-RATE RESPONSE. Howard J. Curfman, Jr. January 12, 1949. 29p. diagrs., 2 tabs. (NACA RM L8K23a)

THEORETICAL INVESTIGATION OF THE DYNAMIC LATERAL STABILITY CHARACTERISTICS OF DOUGLAS DESIGN NO. 39C, AN EARLY VERSION OF THE X-3 RESEARCH AIRPLANE. Charles V. Bennett. January 18, 1949. 39p. diagrs., 2 tabs. (NACA RM L8L31)

AN EXPERIMENTAL INVESTIGATION OF A GYRO-ACTUATED ROLL CONTROL SYSTEM INSTALLED IN A SUBSONIC TEST VEHICLE. Jerome M. Teitelbaum and Ernest C. Seaberg. April 20, 1949. 26p. diagrs., photos., tab. (NACA RM L9B24a)

MEASUREMENT OF THE DYNAMIC LATERAL STABILITY OF THE DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN RUDDER KICKS AT A MACH NUMBER OF 0.72. Hubert M. Drake. May 31, 1949. 10p. diagrs., photos. (NACA RM L9D06a)

EFFECT OF SWEEPBACK ON THE LOW-SPEED STATIC AND ROLLING STABILITY DERIVATIVES OF THIN TAPERED WINGS OF ASPECT RATIO 4. William Letko and Walter D. Wolhart. August 9, 1949. 36p. diagrs., photo. (NACA RM L9F14)

AN EMPIRICAL CRITERION FOR FIN STABILIZING JETTISONABLE NOSE SECTIONS OF AIRPLANES. Stanley H. Scher. December 8, 1949. 21p. diagrs., photo., tab. (NACA RM L9I28)

A STUDY OF THE DYNAMIC STABILITY OF THE BELL X-1 RESEARCH AIRPLANE. Edward C. Polhamus. January 10, 1950. 16p. diagrs., tab. (NACA RM L9K04a)

THEORETICAL INVESTIGATION OF THE DYNAMIC LATERAL STABILITY CHARACTERISTICS OF THE DOUGLAS X-3 RESEARCH AIRPLANE, STUDY 41-B. Charles V. Bennett. April 27, 1950. 31p. diagrs., 3 tabs. (NACA RM L50B28)

FLIGHT INVESTIGATION OF THE AILERON CHARACTERISTICS OF THE DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37972) AT MACH NUMBERS BETWEEN 0.6 AND 0.89. Jim Rogers Thompson, William S. Roden and John M. Eggleston. May 26, 1950. 23p. diagrs., photos., tab. (NACA RM L50D20)

EFFECT OF DHEDRAL CHANGE ON THE THEORETICAL DYNAMIC LATERAL RESPONSE CHARACTERISTICS OF A LOW-ASPECT-RATIO STRAIGHT-WING SUPERSONIC AIRPLANE. Donovan R. Heinle. December 7, 1950. 35p. diagrs., 2 tabs. (NACA RM A50H02)

EFFECTS ON THE LATERAL OSCILLATION OF FIXING THE RUDDER AND REFLEXING THE FLAPS ON THE BELL X-1 AIRPLANE. Hubert M. Drake. December 11, 1950. 14p. diagrs., photo. (NACA RM L50I05)

SUMMARY REPORT OF RESULTS OBTAINED DURING DEMONSTRATION TESTS OF THE NORTHROP X-4 AIRPLANES. Melvin Sadoff and Thomas R. Sisk. December 13, 1950. 46p. diagrs., photos., tab. (NACA RM A50I01)

EFFECTS ON THE SNAKING OSCILLATION OF THE BELL X-1 AIRPLANE OF A TRAILING-EDGE BULB ON THE RUDDER. Hubert M. Drake and Harry P. Clagett. January 16, 1951. 14p. diagrs., photo. (NACA RM L50K01a)

THE EFFECT OF MASS DISTRIBUTION ON THE LOW-SPEED DYNAMIC LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A MODEL WITH A 60° TRIANGULAR WING. Joseph L. Johnson. March 9, 1951. 23p. diagrs., 2 tabs. (NACA RM L50K10)

A COMPARISON OF THE MEASURED AND PREDICTED LATERAL OSCILLATORY CHARACTERISTICS OF A 35° SWEEP-WING FIGHTER AIRPLANE. Walter E. McNeill and George E. Cooper. July 1951. 21p. diagrs., 3 tabs. (NACA RM A51C28)

A FLIGHT STUDY OF REQUIREMENTS FOR SATISFACTORY LATERAL OSCILLATORY CHARACTERISTICS OF FIGHTER AIRCRAFT. Charles J. Liddell, Jr., Brent Y. Creer and Rudolph D. Van Dyke, Jr. July 1951. 39p. diagrs., photo., 2 tabs. (NACA RM A51E16)

SYSTEM ANALYSES AND AUTOPILOT DESIGN FOR AUTOMATIC ROLL STABILIZATION OF A SUPERSONIC PILOTLESS AIRCRAFT. Jacob Zarovsky. July 1951. 55p. diagrs., tab. (NACA RM L51E07)

LOW-SPEED TESTS OF A FREE-TO-YAW MODEL IN TWO WIND TUNNELS OF DIFFERENT TURBULENCE. Jones F. Cahill and John D. Bird. February 1952. 12p. diagrs., photos. (NACA RM L51L14)

FLIGHT MEASUREMENTS OF THE LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A HIGH-SPEED FIGHTER AIRPLANE. H. L. Crane, A. R. Beckhardt and C. E. Matheny. September 1952. 50p. diagrs., tab. (NACA RM L52B14)

LATERAL AND DIRECTIONAL DYNAMIC-RESPONSE CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS. William C. Triplett and Stuart C. Brown. December 1952. 62p. diagrs., photo., 3 tabs. (NACA RM A52I17)

THE EFFECTS ON DYNAMIC LATERAL STABILITY AND CONTROL OF LARGE ARTIFICIAL VARIATIONS IN THE ROTARY STABILITY DERIVATIVES. Robert O. Schade and James L. Hassell, Jr. 1953. ii, 24p. diagrs., photo., 2 tabs. (NACA Rept. 1151. Formerly TN 2781)

FREE-FLIGHT-TUNNEL INVESTIGATION OF THE LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A MODEL HAVING A FUSELAGE OR RELATIVELY FLAT CROSS SECTION. John W. Paulson and Joseph L. Johnson, Jr. February 1953. 30p. diagrs., photo., tab. (NACA RM L52L22)

THEORETICAL CALCULATIONS OF THE LATERAL STABILITY DERIVATIVES FOR TRIANGULAR VERTICAL TAILS WITH SUBSONIC LEADING EDGES TRAVELING AT SUPERSONIC SPEEDS. Percy J. Bobbitt. December 1954. 68p. diagrs., photos., 5 tabs. (NACA TN 3240)



## Lateral and Directional Dynamic Stability (Cont.)

A SYSTEM FOR MEASURING THE DYNAMIC LATERAL STABILITY DERIVATIVES IN HIGH-SPEED WIND TUNNELS. Henry C. Lessing, Thomas B. Fryer and Merrill H. Mead. December 1954. 42p. diags., photo. (NACA TN 3348)

A WIND-TUNNEL TEST TECHNIQUE FOR MEASURING THE DYNAMIC ROTARY STABILITY DERIVATIVES INCLUDING THE CROSS DERIVATIVES AT HIGH MACH NUMBERS. Benjamin H. Beam. January 1955. 35p. diags., photos. (NACA TN 3347)

EFFECT OF LAG OF SIDEWASH ON THE VERTICAL-TAIL CONTRIBUTION TO OSCILLATORY DAMPING IN YAW OF AIRPLANE MODELS. Lewis R. Fisher and Herman S. Fletcher. January 1955. 38p. diags., photos. (NACA TN 3356)

THEORETICAL CALCULATIONS OF THE PRESSURES, FORCES, AND MOMENTS DUE TO VARIOUS LATERAL MOTIONS ACTING ON THIN ISOLATED VERTICAL TAILS WITH SUPERSONIC LEADING AND TRAILING EDGES. Kenneth Margolis. March 1955. 43p. diags., 10 tabs. (NACA TN 3373)

SOME CALCULATIONS OF THE LATERAL RESPONSE OF TWO AIRPLANES TO ATMOSPHERIC TURBULENCE WITH RELATION TO THE LATERAL SNAKING PROBLEM. John D. Bird. May 1955. 24p. diags., 2 tabs. (NACA TN 3425. Formerly RM L50F26a)

## Damping Derivatives (1.8.1.2.3)

FACTORS AFFECTING LATERAL STABILITY AND CONTROLLABILITY. John P. Campbell and Thomas A. Toll. May 13, 1948. 19p. diags. (NACA RM L8A28a)

THEORETICAL ANALYSIS OF THE ROLLING MOTIONS OF AIRCRAFT USING A FLICKER-TYPE AUTOMATIC ROLL STABILIZATION SYSTEM HAVING A DISPLACEMENT-PLUS-RATE RESPONSE. Howard J. Curfman, Jr. January 12, 1949. 29p. diags., 2 tabs. (NACA RM L8K23a)

THEORETICAL INVESTIGATION OF THE DYNAMIC LATERAL STABILITY CHARACTERISTICS OF DOUGLAS DESIGN NO. 39C, AN EARLY VERSION OF THE X-3 RESEARCH AIRPLANE. Charles V. Bennett. January 18, 1949. 39p. diags., 2 tabs. (NACA RM L8L31)

HIGH-SUBSONIC DAMPING-IN-ROLL CHARACTERISTICS OF A WING WITH THE QUARTER-CHORD LINE SWEEP BACK  $35^\circ$  AND WITH ASPECT RATIO 3 AND TAPER RATIO 0.6. Boyd C. Myers, II and Richard E. Kuhn. May 10, 1949. 21p. diags., photo., tab. (NACA RM L9C23)

EFFECTS OF MACH NUMBER AND SWEEP ON THE DAMPING-IN-ROLL CHARACTERISTICS OF WINGS OF ASPECT RATIO 4. Richard E. Kuhn and Boyd C. Myers, II. June 27, 1949. 28p. diags., photo. (NACA RM L9E10)

DAMPING-IN-ROLL CHARACTERISTICS OF A  $42.7^\circ$  SWEEP-BACK WING AS DETERMINED FROM A WIND-TUNNEL INVESTIGATION OF A TWISTED SEMISPAN WING. Vernard E. Lockwood. August 8, 1949. 23p. diags. (NACA RM L9F15)

EFFECT OF SWEEPBACK ON THE LOW-SPEED STATIC AND ROLLING STABILITY DERIVATIVES OF THIN TAPERED WINGS OF ASPECT RATIO 4. William Letko and Walter D. Wolhart. August 9, 1949. 36p. diags., photo. (NACA RM L9F14)

WIND-TUNNEL INVESTIGATION AT LOW TRANSONIC SPEEDS OF THE EFFECTS OF NUMBER OF WINGS ON THE LATERAL-CONTROL EFFECTIVENESS OF AN RM-5 TEST VEHICLE. Harold S. Johnson. November 29, 1949. 15p. diags., photo., tab. (NACA RM L9H16)

A FREE-FLIGHT TECHNIQUE FOR MEASURING DAMPING IN ROLL BY USE OF ROCKET-POWERED MODELS AND SOME INITIAL RESULTS FOR RECTANGULAR WINGS. James L. Edmondson and E. Claude Sanders, Jr. December 20, 1949. 25p. diags., photos. (NACA RM L9I01)

THE EFFECT OF TIP TANKS ON THE ROLLING CHARACTERISTICS AT HIGH SUBSONIC MACH NUMBERS OF A WING HAVING AN ASPECT RATIO OF 3 WITH QUARTER-CHORD LINE SWEEP BACK  $35^\circ$ . Richard E. Kuhn and Boyd C. Myers, II. January 17, 1950. 27p. diags., photo., 2 tabs. (NACA RM L9J19)

THE DAMPING IN ROLL OF ROCKET-POWERED TEST VEHICLES HAVING RECTANGULAR WINGS WITH NACA 65-006 AND SYMMETRICAL DOUBLE-WEDGE AIRFOIL SECTIONS OF ASPECT RATIO 4.5. Albert E. Dietz and James L. Edmondson. March 29, 1950. 12p. diags. (NACA RM L50B10)

THEORETICAL INVESTIGATION OF THE DYNAMIC LATERAL STABILITY CHARACTERISTICS OF THE DOUGLAS X-3 RESEARCH AIRPLANE, STUDY 41-B. Charles V. Bennett. April 27, 1950. 31p. diags., 3 tabs. (NACA RM L50B28)

AERODYNAMIC AND LATERAL-CONTROL CHARACTERISTICS OF A  $1/28$ -SCALE MODEL OF THE BELL X-1 AIRPLANE WING-FUSELAGE COMBINATION. TRANSONIC-BUMP METHOD. Vernard E. Lockwood. May 5, 1950. 28p. diags., tab. (NACA RM L50C22)

DAMPING IN ROLL OF RECTANGULAR WINGS OF SEVERAL ASPECT RATIOS AND NACA 65A-SERIES AIRFOIL SECTIONS OF SEVERAL THICKNESS RATIOS AT TRANSONIC AND SUPERSONIC SPEEDS AS DETERMINED WITH ROCKET-POWERED MODELS. James L. Edmondson. August 24, 1950. 16p. diags. (NACA RM L50E26)

DAMPING IN YAW AND STATIC DIRECTIONAL STABILITY OF A CANARD AIRPLANE MODEL AND OF SEVERAL MODELS HAVING FUSELAGES OF RELATIVELY FLAT CROSS SECTION. Joseph L. Johnson. October 16, 1950. 20p. diags., tab. (NACA RM L50H30a)

EFFECT OF DIHEDRAL CHANGE ON THE THEORETICAL DYNAMIC LATERAL RESPONSE CHARACTERISTICS OF A LOW-ASPECT-RATIO STRAIGHT-WING SUPERSONIC AIRPLANE. Donovan R. Heinle. December 7, 1950. 35p. diags., 2 tabs. (NACA RM A50H02)

PRELIMINARY FLIGHT INVESTIGATION OF THE DYNAMIC LONGITUDINAL-STABILITY CHARACTERISTICS OF A  $35^\circ$  SWEEP-WING AIRPLANE. William C. Triplett and Rudolph D. Van Dyke, Jr. December 11, 1950. 26p. diags., photo., tab. (NACA RM A50J09a)

EFFECTS OF SWEEP ON THE DAMPING-IN-ROLL CHARACTERISTICS OF THREE SWEEPBACK WINGS HAVING AN ASPECT RATIO OF 4 AT TRANSONIC SPEEDS. Vernard E. Lockwood. December 14, 1950. 23p. diags. (NACA RM L50J19)

THE EFFECT OF MASS DISTRIBUTION ON THE LOW-SPEED DYNAMIC LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A MODEL WITH A  $60^\circ$  TRIANGULAR WING. Joseph L. Johnson. March 9, 1951. 23p. diags., 2 tabs. (NACA RM L50K10)



## AERODYNAMICS

### 94 STABILITY AND CONTROL (1.8)

#### Damping Derivatives - Stability (Cont.)

A COMPARISON OF TWO TECHNIQUES UTILIZING ROCKET-PROPELLED VEHICLES FOR THE DETERMINATION OF THE DAMPING-IN-ROLL DERIVATIVE. David G. Stone and Carl A. Sandahl. May 3, 1951. 17p. diagrs., photos. (NACA RM L51A16)

LONGITUDINAL FREQUENCY-RESPONSE CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS, INCLUDING A METHOD FOR THE EVALUATION OF TRANSFER FUNCTIONS. William C. Triplett and G. Allan Smith. September 1951. 45p. diagrs., photo. (NACA RM A51G27)

LONGITUDINAL FREQUENCY-RESPONSE CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE AS DETERMINED FROM EXPERIMENTAL TRANSIENT-RESPONSE HISTORIES TO A MACH NUMBER OF 0.90. Ellwyn E. Angle and Euclid C. Holleman. February 1952. 28p. diagrs., tab. (NACA RM L51K28)

THE CALCULATION OF CERTAIN STATIC AEROELASTIC PHENOMENA OF WINGS WITH TIP TANKS OR BOOM-MOUNTED LIFTING SURFACES. Franklin W. Diederich and Kenneth A. Foss. August 1952. 55p. diagrs., 2 tabs. (NACA RM L52A22)

A STUDY OF THE FLOW FIELD BEHIND THE TRIANGULAR HORIZONTAL TAIL OF A CANARD AIRPLANE AT APPROXIMATELY THE VERTICAL-TAIL LOCATION BY MEANS OF A TUFT GRID. Joseph L. Johnson, Jr. October 1952. 18p. diagrs., tab. (NACA RM L52H11)

LATERAL AND DIRECTIONAL DYNAMIC-RESPONSE CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS. William C. Triplett and Stuart C. Brown. December 1952. 62p. diagrs., photo., 3 tabs. (NACA RM A52I17)

A VECTOR STUDY OF LINEARIZED SUPERSONIC FLOW APPLICATIONS TO NONPLANAR PROBLEMS. John C. Martin. 1953. ii, 34p. diagrs., tab. (NACA Rept. 1143. Formerly TN 2641)

THE EFFECTS ON DYNAMIC LATERAL STABILITY AND CONTROL OF LARGE ARTIFICIAL VARIATIONS IN THE ROTARY STABILITY DERIVATIVES. Robert O. Schade and James L. Hassell, Jr. 1953. ii, 24p. diagrs., photo., 2 tabs. (NACA Rept. 1151. Formerly TN 2781)

FREE-FLIGHT-TUNNEL INVESTIGATION OF THE LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A MODEL HAVING A FUSELAGE OR RELATIVELY FLAT CROSS SECTION. John W. Paulson and Joseph L. Johnson, Jr. February 1953. 30p. diagrs., photo., tab. (NACA RM L52L22)

METHOD FOR CALCULATING THE ROLLING AND YAWING MOMENTS DUE TO ROLLING FOR UNSWEPT WINGS WITH OR WITHOUT FLAPS OR AILERONS BY USE OF NONLINEAR SECTION LIFT DATA. Albert P. Martina. 1954. ii, 16p. diagrs., 11 tabs. (NACA Rept. 1167. Formerly TN 2937)

LIFT AND PITCHING MOMENT AT SUPERSONIC SPEEDS DUE TO CONSTANT VERTICAL ACCELERATION FOR THIN SWEEPBACK TAPERED WINGS WITH STREAMWISE TIPS. SUPERSONIC LEADING AND TRAILING EDGES. Isabella J. Cole and Kenneth Margolis. July 1954. 67p. diagrs., 4 tabs. (NACA TN 3196)

CALCULATED SUBSONIC SPAN LOADS AND RESULTING STABILITY DERIVATIVES OF UNSWEPT AND 45° SWEEPBACK TAIL SURFACES IN SIDESLIP AND IN STEADY ROLL. M. J. Queijo and Donald R. Riley. October 1954. 110p. diagrs., 2 tabs. (NACA TN 3245)

AERODYNAMIC FORCES, MOMENTS, AND STABILITY DERIVATIVES FOR SLENDER BODIES OF GENERAL CROSS SECTION. Alvin H. Sacks. November 1954. (i), 74p. diagrs., 2 tabs. (NACA TN 3283)

THEORETICAL CALCULATIONS OF THE LATERAL STABILITY DERIVATIVES FOR TRIANGULAR VERTICAL TAILS WITH SUBSONIC LEADING EDGES TRAVELING AT SUPERSONIC SPEEDS. Percy J. Bobbitt. December 1954. 68p. diagrs., photos., 5 tabs. (NACA TN 3240)

A SYSTEM FOR MEASURING THE DYNAMIC LATERAL STABILITY DERIVATIVES IN HIGH-SPEED WIND TUNNELS. Henry C. Lessing, Thomas B. Fryer and Merrill H. Mead. December 1954. 42p. diagrs., photo. (NACA TN 3348)

A WIND-TUNNEL TEST TECHNIQUE FOR MEASURING THE DYNAMIC ROTARY STABILITY DERIVATIVES INCLUDING THE CROSS DERIVATIVES AT HIGH MACH NUMBERS. Benjamin H. Beam. January 1955. 35p. diagrs., photos. (NACA TN 3347)

EFFECT OF LAG OF SIDEWASH ON THE VERTICAL-TAIL CONTRIBUTION TO OSCILLATORY DAMPING IN YAW OF AIRPLANE MODELS. Lewis R. Fisher and Herman S. Fletcher. January 1955. 38p. diagrs., photos. (NACA TN 3356)

THEORETICAL CALCULATIONS OF THE PRESSURES, FORCES, AND MOMENTS DUE TO VARIOUS LATERAL MOTIONS ACTING ON THIN ISOLATED VERTICAL TAILS WITH SUPERSONIC LEADING AND TRAILING EDGES. Kenneth Margolis. March 1955. 43p. diagrs., 10 tabs. (NACA TN 3373)

A TECHNIQUE UTILIZING ROCKET-PROPELLED TEST VEHICLES FOR THE MEASUREMENT OF THE DAMPING IN ROLL OF STING-MOUNTED MODELS AND SOME INITIAL RESULTS FOR DELTA AND UNSWEPT TAPERED WINGS. William M. Bland, Jr. and Carl A. Sandahl. May 1955. 25p. diagrs., photos., tab. (NACA TN 3314. Formerly RM L50D24)

TOTAL LIFT AND PITCHING MOMENT ON THIN ARROWHEAD WINGS OSCILLATING IN SUPERSONIC POTENTIAL FLOW. H. J. Cunningham. May 1955. 43p. diagrs., 4 tabs. (NACA TN 3433)

## CONTROL

### (1.8.2)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.20 OF AN ALL-MOVABLE TRIANGULAR WING OF ASPECT RATIO 4 ALONE AND WITH A BODY. Louis S. Stivers, Jr. and Alexander W. Malick. February 2, 1950. 45p. diagrs., photos., tab. (NACA RM A9L01)

THE TIME LAG BETWEEN FLAP DEFLECTION AND FORCE DEVELOPMENT AT A MACH NUMBER OF 4. Walter F. Lindsey and Edward F. Ulmann. February 13, 1950. 11p. diagrs., photos. (NACA RM L9L15)



## Control (Cont.)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.29 OF AN UNSWEPT TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS - TRAILING-EDGE FLAPS DEFLECTED. Louis S. Stivers, Jr. and Alexander W. Malick. December 13, 1950. 45p. diagrs., photo., 5 tabs. (NACA RM A50J09b)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.29 OF AN UNSWEPT, TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS - LEADING-EDGE FLAPS DEFLECTED. Louis S. Stivers, Jr. and Alexander W. Malick. February 26, 1951. 37p. diagrs., photo., 5 tabs. (NACA RM A50K10)

PRELIMINARY EXPERIMENTAL INVESTIGATION OF THE FLIGHT OF A PERSON SUPPORTED BY A JET THRUST DEVICE ATTACHED TO HIS FEET. C. H. Zimmerman, Paul R. Hill and T. L. Kennedy. January 1953. 31p. diagrs., photos., 2 tabs. (NACA RM L52D10)

## LONGITUDINAL CONTROL (1.8.2.1)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEPT-BACK TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. John A. Zalovcik and Richard H. Sawyer. March 28, 1947. 30p. diagrs., photos., tab. (NACA RM L6K21)

FORCE AND LONGITUDINAL CONTROL CHARACTERISTICS OF A 1/16 - SCALE MODEL OF THE BELL XS-1 TRANSONIC RESEARCH AIRPLANE AT HIGH MACH NUMBERS. Axel T. Mattson. May 21, 1947. 32p. diagrs., photo., tab. (NACA RM L7A03)

AN ANALYSIS OF LONGITUDINAL-CONTROL PROBLEMS ENCOUNTERED IN FLIGHT AT TRANSONIC SPEEDS WITH A JET-PROPELLED AIRPLANE. Harvey H. Brown, L. Stewart Rolls and Lawrence A. Clousing. September 25, 1947. 56p. diagrs., photos., 3 tabs. (NACA RM A7G03)

HIGH-SPEED WIND-TUNNEL TESTS OF A MODEL PURSUIT AIRPLANE AND CORRELATION WITH FLIGHT-TEST RESULTS. Joseph W. Cleary and Lyle J. Gray. January 21, 1948. 56p. diagrs., photos. (NACA RM A7H16)

WIND-TUNNEL INVESTIGATION AT A MACH NUMBER OF 1.53 OF AN AIRPLANE WITH A TRIANGULAR WING. Richard Scherrer and William R. Wimbrow. January 23, 1948. 74p. diagrs., photos., 2 tabs. (NACA RM A7J05)

GENERAL HANDLING-QUALITIES RESULTS OBTAINED DURING ACCEPTANCE FLIGHT TESTS OF THE BELL XS-1 AIRPLANE. Walter C. Williams, Charles M. Forsyth and Beverly P. Brown. April 19, 1948. 72p. diagrs., photos., tab. (NACA RM L8A09)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/78-SCALE MODEL OF THE LOCKHEED YP-80A AIRPLANE. Robert N. Olson and Leslie F. Lawrence. May 28, 1948. 52p. diagrs., photos. (NACA RM A7L24)

FORCE, STATIC LONGITUDINAL STABILITY, AND CONTROL CHARACTERISTICS OF A 1/16-SCALE MODEL OF THE BELL XS-1 TRANSONIC RESEARCH AIRPLANE AT HIGH MACH NUMBERS. Axel T. Mattson and Donald L. Loving. June 23, 1948. 49p. diagrs., tab. (NACA RM L8A12)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. LONGITUDINAL STABILITY AND CONTROL OF THE D-558-1. John B. Wright. July 8, 1948. 47p. diagrs., tab. (NACA RM L8C23)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL AT TRANSONIC SPEEDS AS OBTAINED BY THE TRANSONIC-BUMP METHOD. Joseph Weil and M. Leroy Spearman. July 19, 1948. 23p. diagrs., tab. (NACA RM L8B03)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN AIRPLANE MODEL WITH A SWEPTBACK WING AND TAIL FROM TESTS AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. Richard H. Sawyer and Lindsay J. Lina. July 23, 1948. 42p. diagrs., photos., tab. (NACA RM L8B19)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A SEMISPAN MODEL OF A SUPERSONIC AIRPLANE CONFIGURATION AT TRANSONIC SPEEDS FROM TESTS BY THE NACA WING-FLOW METHOD. Norman S. Silsby and James M. McKay. November 8, 1948. 30p. diagrs., photos., tab. (NACA RM L8G30)

DETERMINATION BY THE FREE-FALL METHOD OF THE LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE MODEL OF THE BELL XS-1 AIRPLANE AT TRANSONIC SPEEDS. James T. Matthews, Jr. and Charles W. Mathews. November 9, 1948. 19p. diagrs., photo., tab. (NACA RM L8G29a)

SUMMARY OF RESULTS OF TUMBLING INVESTIGATIONS MADE IN THE LANGLEY 20-FOOT FREE-SPINNING TUNNEL ON 14 DYNAMIC MODELS. Ralph W. Stone, Jr. and Robert L. Bryant. December 31, 1948. 91p. diagrs., photos., 23 tabs. (NACA RM L8J28)

STABILITY RESULTS OBTAINED WITH DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN FLIGHT UP TO A MACH NUMBER OF 0.89. William H. Barlow and Howard C. Lilly. April 22, 1949. 16p. diagrs., photos. (NACA RM L8K03)

THE AERODYNAMIC CHARACTERISTICS THROUGHOUT THE SUBSONIC SPEED RANGE OF A THIN, SHARP-EDGED HORIZONTAL TAIL OF ASPECT RATIO 4 EQUIPPED WITH A CONSTANT-CHORD ELEVATOR. Angelo Bandettini and Verlin D. Reed. June 30, 1949. 50p. diagrs., photo. (NACA RM A9E05)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Alexander D. Hammond. March 10, 1950. 20p. diagrs. (NACA RM L50A03)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LONGITUDINAL STABILITY AND CONTROL. William B. Kemp, Jr. Robert E. Becht and Albert G. Few, Jr. March 14, 1950. 51p. diagrs., photos. (NACA RM L9K08)

INVESTIGATION AT HIGH SUBSONIC SPEEDS OF A 45° SWEPTBACK HORIZONTAL TAIL WITH PLAIN AND HORN-BALANCED CONTROL SURFACES. Harold S. Johnson and Robert F. Thompson. March 31, 1950. 44p. diagrs., photo., tab. (NACA RM L50B13)

LOW-SPEED INVESTIGATION OF DEFLECTABLE WING-TIP ELEVATORS ON A LOW-ASPECT-RATIO UNTAPERED 45° SWEPTBACK SEMISPAN WING WITH AND WITHOUT AN END PLATE. Jack Fischel and William M. O'Hare. June 1, 1950. 21p. diagrs., photo. (NACA RM L50D19)



### Longitudinal Control (Cont.)

WING-FLOW MEASUREMENTS OF LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A CANARD AIRPLANE CONFIGURATION WITH A 45° SWEEPBACK WING AND A TRIANGULAR ALL-MOVABLE CONTROL SURFACE. Harold L. Crane and James J. Adams. August 25, 1950. 53p. diags., photo. (NACA RM L50A31)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LONGITUDINAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. September 8, 1950. 80p. diags., photos., 2 tabs. (NACA RM A50G06)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS AT HIGH-SUBSONIC SPEEDS OF TWO MODELS OF A TRANSONIC RESEARCH AIRPLANE WITH WINGS AND HORIZONTAL TAILS OF ASPECT RATIOS 4.2 AND 2. Arvo A. Luoma and John B. Wright. September 29, 1950. 134p. diags., photos., 3 tabs. (NACA RM L50H07)

LONGITUDINAL CHARACTERISTICS AT MACH NUMBER OF 1.24 OF A 1/30-SCALE SEMISPAN MODEL OF BELL X-5 VARIABLE-SWEEP AIRPLANE WITH WING SWEEP BACK 60° FROM TESTS BY NACA WING-FLOW METHOD. Norman S. Silsby, Garland J. Morris and Robert M. Kennedy. October 12, 1950. 17p. diags., photos., tab. (NACA RM L50E02a)

PRELIMINARY FLIGHT INVESTIGATION OF THE DYNAMIC LONGITUDINAL-STABILITY CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE. William C. Triplett and Rudolph D. Van Dyke, Jr. December 11, 1950. 26p. diags., photo., tab. (NACA RM A50J09a)

STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL IN THE LANDING CONFIGURATION. Robert E. Becht. December 18, 1950. 38p. diags., photos. (NACA RM L50J27)

LONGITUDINAL-CONTROL EFFECTIVENESS AND DOWNWASH CHARACTERISTICS AT A MACH NUMBER OF 1.24 OF A 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 AIRPLANE AS DETERMINED BY THE NACA WING-FLOW METHOD. Richard H. Sawyer, Robert M. Kennedy and Garland J. Morris. January 8, 1951. 37p. diags., photos., tab. (NACA RM L50K15)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A 60° DELTA WING EQUIPPED WITH A TRIANGULAR PLAN-FORM CONTROL HAVING A SKEWED HINGE AXIS AND AN OVERHANG BALANCE. TRANSONIC-BUMP METHOD. Harleth G. Wiley. February 6, 1951. 31p. diags. (NACA RM L50L01)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP-TYPE CONTROL. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and Joseph E. Fikes. August 1951. 35p. diags. (NACA RM L51F06a)

LONGITUDINAL FREQUENCY-RESPONSE CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS, INCLUDING A METHOD FOR THE EVALUATION OF TRANSFER FUNCTIONS. William C. Triplett and G. Allan Smith. September 1951. 45p. diags., photo. (NACA RM A51G27)

A METHOD FOR THE DESIGN OF SWEEPBACK WINGS WARPED TO PRODUCE SPECIFIED FLIGHT CHARACTERISTICS AT SUPERSONIC SPEEDS. Warren A. Tucker. September 1951. 52p. diags., 2 tabs. (NACA RM L51F08)

AN INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECTS OF CONTROL CHORD AND SPAN ON THE CONTROL CHARACTERISTICS OF A TAPERED WEDGE-TYPE WING OF ASPECT RATIO 2.5. TRANSONIC-BUMP METHOD. Raymond D. Vogler, Vernard E. Lockwood and Thomas R. Turner. September 1951. 36p. diags. (NACA RM L51G03)

MEASUREMENTS IN FLIGHT OF THE LONGITUDINAL CHARACTERISTICS OF TWO JET AIRCRAFT, ONE WITH A DIVING TENDENCY AND THE OTHER WITH A CLIMBING TENDENCY AT HIGH MACH NUMBERS. Seth B. Anderson. October 1951. 18p. diags., photos., 2 tabs. (NACA RM A51E14)

A FLIGHT EVALUATION OF THE LONGITUDINAL STABILITY CHARACTERISTICS ASSOCIATED WITH THE PITCH-UP OF A SWEEP-WING AIRPLANE IN MANEUVERING FLIGHT AT TRANSONIC SPEEDS. Seth B. Anderson and Richard S. Bray. November 1951. 33p. diags., photo., tab. (NACA RM A51I12)

INVESTIGATION OF WING-TIP AILERONS ON A 51.3° SWEEPBACK WING AT TRANSONIC SPEEDS BY THE TRANSONIC-BUMP METHOD. William C. Moseley, Jr. and James M. Watson. November 1951. 60p. diags. (NACA RM L51H27)

EFFECTS OF HORIZONTAL-TAIL POSITION, AREA, AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 60° TRIANGULAR-WING MODEL HAVING VARIOUS TRIANGULAR-ALL-MOVABLE HORIZONTAL TAILS. Byron M. Jaquet. December 1951. 61p. diags., photo., tab. (NACA RM L51I06)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP TYPE OF CONTROL WITH OVERHANG BALANCE. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and John R. Hagerman. January 1952. 24p. diags. (NACA RM L51L11)

LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF 60° TRIANGULAR-WING AND MODIFIED 60° TRIANGULAR-WING MODELS HAVING HALF-DELTA AND HALF-DIAMOND TIP CONTROLS. Jacob H. Lichtenstein and Byron M. Jaquet. February 1952. 36p. diags., photos., tab. (NACA RM L51K08)

HINGE-MOMENT AND OTHER AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A QUARTER-SPAN SPOILER ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Joseph E. Fikes. February 1952. 22p. diags., photo. (NACA RM L52A03)

EFFECTS OF HORIZONTAL-TAIL POSITION AND ASPECT RATIO ON LOW-SPEED STATIC LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A 60° TRIANGULAR-WING MODEL HAVING TWIN TRIANGULAR ALL-MOVABLE TAILS. Byron M. Jaquet. May 1952. 45p. diags., photos. (NACA RM L52B25)

AN INVESTIGATION OF LONGITUDINAL CONTROL CHARACTERISTICS OF A WING-TIP CONTROL SURFACE ON A SWEEPBACK WING AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. James P. Trant, Jr. June 1952. 23p. diags., photos., tab. (NACA RM L52B15a)



## Longitudinal Control (Cont.)

CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A LINKED FLAP AND SPOILER ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. July 1952. 24p. diagrs., photo. (NACA RM L52D25)

CONTROL EFFECTIVENESS AND HINGE-MOMENT CHARACTERISTICS AT LOW SPEED OF LARGE-CHORD, HORN-BALANCED, FLAP-TYPE CONTROLS ON A TRIANGULAR WING OF ASPECT RATIO 2. Jules B. Dods, Jr. August 1952. 53p. diagrs., photos., 2 tabs. (NACA RM A52F13)

HINGE-MOMENT AND CONTROL-EFFECTIVENESS CHARACTERISTICS OF AN OUTBOARD FLAP WITH AN OVERHANG NOSE BALANCE ON A TAPERED 35° SWEEPBACK WING OF ASPECT RATIO 4. TRANSONIC-BUMP METHOD. Robert F. Thompson and William C. Moseley, Jr. August 1952. 51p. diagrs. (NACA RM L52G08)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A 60° DELTA WING EQUIPPED WITH A CONSTANT-CHORD FLAP-TYPE CONTROL WITH AND WITHOUT AN UNSHIELDED HORN BALANCE. TRANSONIC-BUMP METHOD. Harleth G. Wiley and Leon Zontek. September 1952. 25p. diagrs. (NACA RM L51H22)

TESTS OF A CENTERING SPRING USED AS AN ARTIFICIAL FEEL DEVICE ON THE ELEVATOR OF A FIGHTER AIRPLANE. James J. Adams and James B. Whitten. September 1952. 18p. diagrs., photo., tab. (NACA RM L52G16)

INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECT OF A POSITIVE-LIFT BALANCING TAB ON THE HINGE-MOMENT AND LIFT CHARACTERISTICS OF A FULL-SPAN FLAP ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. November 1952. 22p. diagrs., photo. (NACA RM L52J09)

FREE-FLIGHT-TUNNEL INVESTIGATION OF THE LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A MODEL HAVING A FUSELAGE OR RELATIVELY FLAT CROSS SECTION. John W. Paulson and Joseph L. Johnson, Jr. February 1953. 30p. diagrs., photo., tab. (NACA RM L52L22)

INVESTIGATION AT TRANSONIC SPEEDS OF THE HINGE-MOMENT AND LIFT-EFFECTIVENESS CHARACTERISTICS OF A SINGLE FLAP AND A TANDEM FLAP ON A 60° DELTA WING. Delwin R. Croom and Harleth G. Wiley. July 1953. 16p. diagrs. (NACA RM L53E28a)

THE EFFECT OF CONTROL-SURFACE-SERVO NATURAL FREQUENCY ON THE DYNAMIC PERFORMANCE CHARACTERISTICS OF AN ACCELERATION CONTROL SYSTEM APPLIED TO A SUPERSONIC MISSILE. Anthony L. Passera and Martin L. Nason. September 1953. 28p. diagrs., 3 tabs. (NACA RM L53G23a)

DYNAMIC STABILITY AND CONTROL CHARACTERISTICS OF A CASCADE-WING VERTICALLY RISING AIRPLANE MODEL IN TAKE-OFFS, LANDINGS, AND HOVERING FLIGHT. Marion O. McKinney, Louis P. Tosti and Edwin E. Davenport. June 1954. 45p. diagrs., photos., tab. (NACA TN 3198)

THEORETICAL INVESTIGATION OF LONGITUDINAL RESPONSE CHARACTERISTICS OF A SWEEP-WING FIGHTER AIRPLANE HAVING A NORMAL-ACCELERATION CONTROL SYSTEM AND A COMPARISON WITH OTHER TYPES OF SYSTEMS. Fred H. Stokes and Charles W. Mathews. July 1954. 50p. diagrs., tab. (NACA TN 3191)

THEORETICAL ANALYSIS OF AN AIRPLANE ACCELERATION RESTRICTOR CONTROLLED BY NORMAL ACCELERATION, PITCHING ACCELERATION, AND PITCHING VELOCITY. Christopher C. Kraft, Jr. September 1954. 42p. diagrs., 3 tabs. (NACA TN 3243)

OPERATING CHARACTERISTICS OF AN ACCELERATION RESTRICTOR AS DETERMINED BY MEANS OF A SIMULATOR. Arthur Assadourian. December 1954. 20p. diagrs., photos. (NACA TN 3319)

GROUND-SIMULATOR STUDY OF THE EFFECTS OF STICK FORCE AND DISPLACEMENT ON TRACKING PERFORMANCE. Stanley Faber. April 1955. 21p. diagrs., photos. (NACA TN 3428)

HOVERING FLIGHT TESTS OF A FOUR-ENGINE-TRANSPORT VERTICAL TAKE-OFF AIRPLANE MODEL UTILIZING A LARGE FLAP AND EXTENSIBLE VANES FOR REDIRECTING THE PROPELLER SLIPSTREAM. Louis P. Tosti and Edwin E. Davenport. May 1955. 26p. diagrs., photos., tab. (NACA TN 3440)

## LATERAL CONTROL (1.8.2.2)

OBSERVATIONS ON AN AILERON-FLUTTER INSTABILITY ENCOUNTERED ON A 45° SWEEPBACK WING IN TRANSONIC AND SUPERSONIC FLIGHT. Marvin Pitkin, William N. Gardner and Howard J. Curfman, Jr. April 11, 1947. 23p. diagrs., photos. (NACA RM L6L09)

FLIGHT-TEST MEASUREMENTS OF AILERON CONTROL SURFACE BEHAVIOUR AT SUPERCRITICAL MACH NUMBERS. Harvey H. Brown, George A. Rathert, Jr. and Lawrence A. Clousing. April 23, 1947. 26p. diagrs., photos., 2 tabs. (NACA RM A7A15)

GENERAL HANDLING-QUALITIES RESULTS OBTAINED DURING ACCEPTANCE FLIGHT TESTS OF THE BELL XS-1 AIRPLANE. Walter C. Williams, Charles M. Forsyth and Beverly P. Brown. April 19, 1948. 72p. diagrs., photos., tab. (NACA RM L8A09)

FACTORS AFFECTING LATERAL STABILITY AND CONTROLLABILITY. John P. Campbell and Thomas A. Toll. May 13, 1948. 19p. diagrs. (NACA RM L8A28a)

FREE-FLIGHT INVESTIGATION OF THE ROLLING EFFECTIVENESS OF A WING-SPOILER ARRANGEMENT AT HIGH SUBSONIC, TRANSONIC, AND SUPERSONIC SPEEDS. Carl A. Sandahl. May 17, 1948. 10p. diagrs., photo. (NACA RM L8A07)

PRELIMINARY FREE-FLIGHT INVESTIGATION OF THE EFFECT OF AIRFOIL SECTION ON AILERON ROLLING EFFECTIVENESS AT TRANSONIC AND SUPERSONIC SPEEDS. Carl A. Sandahl. June 25, 1948. 6p. diagrs. (NACA RM L8B26)

PRELIMINARY INVESTIGATION OF VARIOUS AILERONS ON A 42° SWEEPBACK WING FOR LATERAL CONTROL AT TRANSONIC SPEEDS. Thomas R. Turner, Vernard E. Lockwood and Raymond D. Vogler. September 7, 1948. 35p. diagrs., photo. (NACA RM L8D21)

AERODYNAMIC CHARACTERISTICS AT SUBSONIC AND TRANSONIC SPEEDS OF A 42.7° SWEEPBACK WING MODEL HAVING AN AILERON WITH FINITE TRAILING-EDGE THICKNESS. Thomas R. Turner, Vernard E. Lockwood and Raymond D. Vogler. January 12, 1949. 24p. diagrs., photo. (NACA RM L8K02)



Lateral Control (Cont.)

FULL-SCALE INVESTIGATION OF A WING WITH THE LEADING EDGE SWEEP BACK  $47.5^\circ$  AND HAVING CIRCULAR-ARC AND FINITE-TRAILING-EDGE-THICKNESS AILERONS. Roy H. Lange. March 11, 1949. 16p. diagrs., photo. (NACA RM L9B02)

AN EXPERIMENTAL INVESTIGATION OF A GYRO-ACTUATED ROLL CONTROL SYSTEM INSTALLED IN A SUBSONIC TEST VEHICLE. Jerome M. Teitelbaum and Ernest C. Seaberg. April 20, 1949. 26p. diagrs., photos., tab. (NACA RM L9B24a)

HIGH-SUBSONIC DAMPING-IN-ROLL CHARACTERISTICS OF A WING WITH THE QUARTER-CHORD LINE SWEEP BACK  $35^\circ$  AND WITH ASPECT RATIO 3 AND TAPER RATIO 0.6. Boyd C. Myers, II and Richard E. Kuhn. May 10, 1949. 21p. diagrs., photo., tab. (NACA RM L9C23)

WIND-TUNNEL INVESTIGATION AT HIGH SUBSONIC SPEEDS OF THE LATERAL-CONTROL CHARACTERISTICS OF AN AILERON AND A STEPPED SPOILER ON A WING WITH LEADING EDGE SWEEP BACK  $51.3^\circ$ . Leslie E. Schneider and John R. Hagerman. June 7, 1949. 34p. diagrs., photo. (NACA RM L9D06)

MEASUREMENTS OF AILERON EFFECTIVENESS OF BELL X-1 AIRPLANE UP TO A MACH NUMBER OF 0.82. Hubert M. Drake. June 20, 1949. 7p. diagrs. (NACA RM L9D13)

EFFECTS OF MACH NUMBER AND SWEEP ON THE DAMPING-IN-ROLL CHARACTERISTICS OF WINGS OF ASPECT RATIO 4. Richard E. Kuhn and Boyd C. Myers, II. June 27, 1949. 28p. diagrs., photo. (NACA RM L9E10)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK  $45^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Raymond D. Vogler. August 15, 1949. 22p. diagrs. (NACA RM L9F29a)

INVESTIGATION OF EXTENSIBLE WING-TIP AILERONS ON AN UNTAPERED SEMISPAN WING AT  $0^\circ$  AND  $45^\circ$  SWEEPBACK. John R. Hagerman and William M. O'Hare. September 20, 1949. 40p. diagrs., photo., tab. (NACA RM L9H04)

WIND-TUNNEL INVESTIGATION AT LOW TRANSONIC SPEEDS OF THE EFFECTS OF NUMBER OF WINGS ON THE LATERAL-CONTROL EFFECTIVENESS OF AN RM-5 TEST VEHICLE. Harold S. Johnson. November 29, 1949. 15p. diagrs., photo., tab. (NACA RM L9H16)

LOW-SPEED INVESTIGATION OF DEFLECTABLE WING-TIP AILERONS ON AN UNTAPERED  $45^\circ$  SWEEPBACK SEMISPAN WING WITH AND WITHOUT AN END PLATE. Jack Fischel and James M. Watson. December 14, 1949. 32p. diagrs., photo. (NACA RM L9J28)

THE EFFECT OF TIP TANKS ON THE ROLLING CHARACTERISTICS AT HIGH SUBSONIC MACH NUMBERS OF A WING HAVING AN ASPECT RATIO OF 3 WITH QUARTER-CHORD LINE SWEEP BACK  $35^\circ$ . Richard E. Kuhn and Boyd C. Myers, II. January 17, 1950. 27p. diagrs., photo., 2 tabs. (NACA RM L9J19)

INVESTIGATION OF EFFECT OF SPAN AND SPANWISE LOCATION OF PLAIN AND STEPPED SPOILER AILERONS ON LATERAL CONTROL CHARACTERISTICS OF A WING WITH LEADING EDGE SWEEP BACK  $51.3^\circ$ . Jack Fischel and Alexander D. Hammond. January 18, 1950. 59p. diagrs., photos. (NACA RM L9K02)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK  $35^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Robert F. Thompson. January 25, 1950. 22p. diagrs., tab. (NACA RM L9L12a)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH QUARTER-CHORD LINE SWEEP BACK  $60^\circ$ , ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Raymond D. Vogler. March 2, 1950. 21p. diagrs. (NACA RM L50A17)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE CONTROLS ON A WING WITH UNSWEPT QUARTER-CHORD LINE, ASPECT RATIO 4, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Alexander D. Hammond. March 10, 1950. 20p. diagrs. (NACA RM L50A03)

FLIGHT INVESTIGATION OF THE EFFECT OF THICKENING THE AILERON TRAILING EDGE ON CONTROL EFFECTIVENESS FOR SWEEPBACK TAPERED WINGS HAVING SHARP- AND ROUND-NOSE SECTIONS. H. Kurt Strass and Edison M. Fields. May 2, 1950. 20p. diagrs., photo., tab. (NACA RM L9L19)

AERODYNAMIC AND LATERAL-CONTROL CHARACTERISTICS OF A 1/28-SCALE MODEL OF THE BELL X-1 AIRPLANE WING-FUSELAGE COMBINATION. TRANSONIC-BUMP METHOD. Vernard E. Lockwood. May 5, 1950. 28p. diagrs., tab. (NACA RM L50C22)

FLIGHT INVESTIGATION OF THE AILERON CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE (BUAERO NO. 37972) AT MACH NUMBERS BETWEEN 0.6 AND 0.89. Jim Rogers Thompson, William S. Roden and John M. Eggleston. May 26, 1950. 23p. diagrs., photos., tab. (NACA RM L50D20)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LATERAL AND DIRECTIONAL STABILITY AND CONTROL. William B. Kemp, Jr. and Robert E. Becht. June 20, 1950. 97p. diagrs., photos. (NACA RM L50C17a)

LATERAL-CONTROL INVESTIGATION OF FLAP-TYPE AND SPOILER-TYPE CONTROLS ON A WING WITH QUARTER-CHORD-LINE SWEEPBACK OF  $60^\circ$ , ASPECT RATIO 2, TAPER RATIO 0.6, AND NACA 65A006 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Alexander D. Hammond. July 18, 1950. 26p. diagrs. (NACA RM L50E09)

INVESTIGATION OF FLAP-TYPE AILERONS ON AN UNTAPERED WING HAVING AN ASPECT RATIO OF 3.7,  $45^\circ$  SWEEPBACK, AND AN NACA 65A009 AIRFOIL SECTION. TRANSONIC-BUMP METHOD. Richard G. MacLeod. August 23, 1950. 18p. diagrs. (NACA RM L50G03)

INVESTIGATION AT TRANSONIC SPEEDS OF A 35-PERCENT-CHORD AILERON ON A TAPERED WEDGE-TYPE WING OF ASPECT RATIO 2.5 WITH AND WITHOUT A FUSELAGE. Thomas R. Turner and Joseph E. Fikes. September 8, 1950. 25p. diagrs. (NACA RM L50G13a)

PRELIMINARY FLIGHT INVESTIGATION OF THE WING-DROPPING TENDENCY AND LATERAL-CONTROL CHARACTERISTICS OF A  $35^\circ$  SWEEP-WING AIRPLANE AT TRANSONIC MACH NUMBERS. George A. Rathert, Jr., L. Stewart Rolls, Lee Winograd and George E. Cooper. September 11, 1950. 14p. diagrs., photo., tab. (NACA RM A50H03)



### Lateral Control (Cont.)

LOW-SPEED INVESTIGATION OF THE EFFECT OF SEVERAL FLAP AND SPOILER AILERONS ON THE LATERAL CHARACTERISTICS OF A 47.5° SWEEPBACK-WING - FUSELAGE COMBINATION AT A REYNOLDS NUMBER OF  $4.4 \times 10^6$ . Jerome Pasamanick and Thomas B. Sellers. December 8, 1950. 57p. diagrs., photo. (NACA RM L50J20)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A 60° DELTA WING EQUIPPED WITH A TRIANGULAR PLAN-FORM CONTROL HAVING A SKEWED HINGE AXIS AND AN OVERHANG BALANCE. TRANSONIC-BUMP METHOD. Harleth G. Wiley. February 6, 1951. 31p. diagrs. (NACA RM L50L01)

THE EFFECT OF MASS DISTRIBUTION ON THE LOW-SPEED DYNAMIC LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A MODEL WITH A 60° TRIANGULAR WING. Joseph L. Johnson. March 9, 1951. 23p. diagrs., 2 tabs. (NACA RM L50K10)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LATERAL AND DIRECTIONAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. March 16, 1951. 56p. diagrs., photos., tab. (RM A51A16)

FLIGHT MEASUREMENTS OF THE WING-DROPPING TENDENCY OF A STRAIGHT-WING JET AIRPLANE AT HIGH SUBSONIC MACH NUMBERS. Seth B. Anderson, Edward A. Ernst and Rudolph D. Van Dyke, Jr. April 24, 1951. 16p. diagrs., photo., tab. (NACA RM A51B28)

EFFECT OF A DEFLECTABLE WING-TIP CONTROL ON THE LOW-SPEED LATERAL AND LONGITUDINAL CHARACTERISTICS OF A LARGE-SCALE WING WITH THE LEADING EDGE SWEEP BACK 47.5°. Roy H. Lange and Marvin P. Fink. April 26, 1951. 41p. diagrs., photo., 2 tabs. (NACA RM L51C07)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP-TYPE CONTROL. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and Joseph E. Fikes. August 1951. 35p. diagrs. (NACA RM L51F06a)

AN INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECTS OF CONTROL CHORD AND SPAN ON THE CONTROL CHARACTERISTICS OF A TAPERED WEDGE-TYPE WING OF ASPECT RATIO 2.5. TRANSONIC-BUMP METHOD. Raymond D. Vogler, Vernard E. Lockwood and Thomas R. Turner. September 1951. 36p. diagrs. (NACA RM L51G03)

STABILITY AND CONTROL MEASUREMENTS OBTAINED DURING USAF-NACA COOPERATIVE FLIGHT-TEST PROGRAM ON THE X-4 AIRPLANE (USAF NO. 46-677). Melvin Sadoff, Herman O. Ankenbruck and William O'Hare. October 1951. 38p. diagrs., photos., tab. (NACA RM A51H09)

INVESTIGATION OF WING-TIP AILERONS ON A 51.3° SWEEPBACK WING AT TRANSONIC SPEEDS BY THE TRANSONIC-BUMP METHOD. William C. Moseley, Jr. and James M. Watson. November 1951. 60p. diagrs. (NACA RM L51H27)

THE EFFECT OF RAKING THE AILERON TIPS ON THE LATERAL-CONTROL AND HINGE-MOMENT CHARACTERISTICS OF A 20-PERCENT-CHORD PARTIAL-SPAN OUTBOARD AILERON ON A WING WITH LEADING EDGE SWEEP BACK 51.3°. Alexander D. Hammond. November 1951. 41p. diagrs., photo., tab. (NACA RM L51H29)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP TYPE OF CONTROL WITH OVERHANG BALANCE. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and John R. Hagerman. January 1952. 24p. diagrs. (NACA RM L51L11)

THE EFFECTIVENESS OF WING VORTEX GENERATORS IN IMPROVING THE MANEUVERING CHARACTERISTICS OF A SWEEP-WING AIRPLANE AT TRANSONIC SPEEDS. Norman M. McFadden, George A. Rathert, Jr. and Richard S. Bray. February 1952. 45p. photos., diagrs., tab. (NACA RM A51J18)

LOW-SPEED WIND-TUNNEL INVESTIGATION OF A FIXED AND A FREE-FLOATING WING-TIP AILERON ON A WING WITH LEADING EDGE SWEEP BACK 51.3°. R. G. MacLeod. February 1952. 17p. diagrs., photo., tab. (NACA RM L51H16a)

PRELIMINARY INVESTIGATION OF THE EFFECTS OF A PADDLE BALANCE ON THE CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45.58° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP-TYPE CONTROL. William C. Moseley, Jr. February 1952. 24p. diagrs., photo. (NACA RM L51L19)

HINGE-MOMENT AND OTHER AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A QUARTER-SPAN SPOILER ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Joseph E. Fikes. February 1952. 22p. diagrs., photo. (NACA RM L52A03)

PRELIMINARY INVESTIGATION OF CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3 HAVING A HORN-BALANCED FULL-SPAN CONTROL. John G. Lowry and Joseph E. Fikes. April 1952. 22p. diagrs., photo. (NACA RM L52A11)

PRELIMINARY INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECT OF BALANCING TABS ON THE HINGE-MOMENT AND OTHER AERODYNAMIC CHARACTERISTICS OF A FULL-SPAN FLAP ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. April 1952. 27p. diagrs., photo., (NACA RM L52A23)

CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A LINKED FLAP AND SPOILER ON A TAPERED 45° SWEEPBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. July 1952. 24p. diagrs., photo. (NACA RM L52D25)

THE CALCULATION OF CERTAIN STATIC AEROELASTIC PHENOMENA OF WINGS WITH TIP TANKS OR BOOM-MOUNTED LIFTING SURFACES. Franklin W. Diederich and Kenneth A. Foss. August 1952. 55p. diagrs., 2 tabs. (NACA RM L52A22)

LATERAL-CONTROL INVESTIGATION AT TRANSONIC SPEEDS OF RETRACTABLE SPOILER AND PLUG-TYPE SPOILER-SLOT AILERONS ON A TAPERED 60° SWEEPBACK WING OF ASPECT RATIO 2. TRANSONIC-BUMP METHOD. Alexander D. Hammond and James M. Watson. August 1952. 19p. diagrs. (NACA RM L52F16)

HINGE-MOMENT AND CONTROL-EFFECTIVENESS CHARACTERISTICS OF AN OUTBOARD FLAP WITH AN OVERHANG NOSE BALANCE ON A TAPERED 35° SWEEPBACK WING OF ASPECT RATIO 4. TRANSONIC-BUMP METHOD. Robert F. Thompson and William C. Moseley, Jr. August 1952. 51p. diagrs. (NACA RM L52G08)



## Lateral Control (Cont.)

FLIGHT MEASUREMENTS OF THE LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A HIGH-SPEED FIGHTER AIRPLANE. H. L. Crane, A. R. Beckhardt and C. E. Matheny. September 1952. 50p. diagrs., tab. (NACA RM L52B14)

THE EFFECT OF VARIOUS AERODYNAMIC BALANCES ON THE LOW-SPEED LATERAL-CONTROL AND HINGE-MOMENT CHARACTERISTICS OF A 0.20-CHORD PARTIAL-SPAN OUTBOARD AILERON ON A WING WITH LEADING EDGE SWEEP BACK 51.3°. Alexander D. Hammond. September 1952. 40 p. diagrs., photo., tab. (NACA RM L52G03)

LOW-SPEED LATERAL-CONTROL INVESTIGATION OF A FLAP-TYPE SPOILER AILERON WITH AND WITHOUT A DEFLECTOR AND SLOT ON A 6-PERCENT-THICK, TAPERED, 45° SWEEPBACK WING OF ASPECT RATIO 4. James M. Watson. September 1952. 11p. diagrs. (NACA RM L52G10)

A WIND-TUNNEL INVESTIGATION AT LOW SPEEDS OF THE AERODYNAMIC CHARACTERISTICS OF VARIOUS SPOILER CONFIGURATIONS ON A THIN 60° DELTA WING. Harleth G. Wiley and Martin Solomon. November 1952. 20p. diagrs. (NACA RM L52J13)

LATERAL AND DIRECTIONAL DYNAMIC-RESPONSE CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS. William C. Triplett and Stuart C. Brown. December 1952. 62p. diagrs., photo., 3 tabs. (NACA RM A52I17)

CHARACTERISTICS OF FLAP-TYPE SPOILER AILERONS AT VARIOUS LOCATIONS ON A 60° DELTA WING WITH A DOUBLE SLOTTED FLAP. Delwin R. Croom. December 1952. 31p. diagrs., 3 tabs. (NACA RM L52J24)

THE EFFECTS ON DYNAMIC LATERAL STABILITY AND CONTROL OF LARGE ARTIFICIAL VARIATIONS IN THE ROTARY STABILITY DERIVATIVES. Robert O. Schade and James L. Hassell, Jr. 1953. ii, 24p. diagrs., photo., 2 tabs. (NACA Rept. 1151. Formerly TN 2781)

INVESTIGATION AT TRANSONIC SPEEDS OF THE HINGE-MOMENT AND LIFT-EFFECTIVENESS CHARACTERISTICS OF A SINGLE FLAP AND A TANDEM FLAP ON A 60° DELTA WING. Delwin R. Croom and Harleth G. Wiley. July 1953. 16p. diagrs. (NACA RM L53E28a)

LOW-SPEED INVESTIGATION OF THE LATERAL CONTROL CHARACTERISTICS OF THREE TIP AILERONS ON A 60° TRIANGULAR WING. Stanley M. Gottlieb. August 1953. 24p. diagrs., photo. (NACA RM L53F16a)

METHOD FOR CALCULATING THE ROLLING AND YAWING MOMENTS DUE TO ROLLING FOR UNSWEPT WINGS WITH OR WITHOUT FLAPS OR AILERONS BY USE OF NONLINEAR SECTION LIFT DATA. Albert P. Martina. 1954. ii, 16p. diagrs., 11 tabs. (NACA Rept. 1167. Formerly TN 2937)

DYNAMIC STABILITY AND CONTROL CHARACTERISTICS OF A CASCADE-WING VERTICALLY RISING AIRPLANE MODEL IN TAKE-OFFS, LANDINGS, AND HOVERING FLIGHT. Marion O. McKinney, Louis P. Tosti and Edwin E. Davenport. June 1954. 45p. diagrs., photos., tab. (NACA TN 3198)

A SIMPLIFIED METHOD FOR CALCULATING AEROELASTIC EFFECTS ON THE ROLL OF AIRCRAFT. John M. Hedgepeth, Paul G. Waner, Jr. and Robert J. Kell. March 1955. 26p. diagrs., 4 tabs. (NACA TN 3370)

HOVERING FLIGHT TESTS OF A FOUR-ENGINE-TRANSPORT VERTICAL TAKE-OFF AIRPLANE MODEL UTILIZING A LARGE FLAP AND EXTENSIBLE VANES FOR REDIRECTING THE PROPELLER SLIPSTREAM. Louis P. Tosti and Edwin E. Davenport. May 1955. 26p. diagrs., photos., tab. (NACA TN 3440)

## DIRECTIONAL CONTROL (1. 8. 2. 3)

WIND-TUNNEL INVESTIGATION AT A MACH NUMBER OF 1.53 OF AN AIRPLANE WITH A TRIANGULAR WING. Richard Scherrer and William R. Wimbrow. January 23, 1948. 74p. diagrs., photos., 2 tabs. (NACA RM A7J05)

GENERAL HANDLING-QUALITIES RESULTS OBTAINED DURING ACCEPTANCE FLIGHT TESTS OF THE BELL XS-1 AIRPLANE. Walter C. Williams, Charles M. Forsyth and Beverly P. Brown. April 19, 1948. 72p. diagrs., photos., tab. (NACA RM L8A09)

FACTORS AFFECTING LATERAL STABILITY AND CONTROLLABILITY. John P. Campbell and Thomas A. Toll. May 13, 1948. 19p. diagrs. (NACA RM L8A28a)

STABILITY AND CONTROL CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL. LATERAL AND DIRECTIONAL STABILITY AND CONTROL. William B. Kemp, Jr. and Robert E. Becht. June 20, 1950. 97p. diagrs., photos. (NACA RM L50C17a)

PRELIMINARY FLIGHT INVESTIGATION OF THE WING-DROPPING TENDENCY AND LATERAL-CONTROL CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AT TRANSONIC MACH NUMBERS. George A. Rathert, Jr., L. Stewart Rolls, Lee Winograd and George E. Cooper. September 11, 1950. 14p. diagrs., photo., tab. (NACA RM A50H03)

LOW-SPEED INVESTIGATION OF A 0.16-SCALE MODEL OF THE X-3 AIRPLANE - LATERAL AND DIRECTIONAL CHARACTERISTICS. Noel K. Delany and Nora-Lee F. Hayter. March 16, 1951. 56p. diagrs., photos., tab. (RM A51A16)

CONTROL EFFECTIVENESS AND HINGE-MOMENT CHARACTERISTICS AT LOW SPEED OF LARGE-CHORD, HORN-BALANCED, FLAP-TYPE CONTROLS ON A TRIANGULAR WING OF ASPECT RATIO 2. Jules B. Dods, Jr. August 1952. 53p. diagrs., photos., 2 tabs. (NACA RM A52F13)

FLIGHT MEASUREMENTS OF THE LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A HIGH-SPEED FIGHTER AIRPLANE. H. L. Crane, A. R. Beckhardt and C. E. Matheny. September 1952. 50p. diagrs., tab. (NACA RM L52B14)

LATERAL AND DIRECTIONAL DYNAMIC-RESPONSE CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS. William C. Triplett and Stuart C. Brown. December 1952. 62p. diagrs., photo., 3 tabs. (NACA RM A52I17)

THE EFFECTS ON DYNAMIC LATERAL STABILITY AND CONTROL OF LARGE ARTIFICIAL VARIATIONS IN THE ROTARY STABILITY DERIVATIVES. Robert O. Schade and James L. Hassell, Jr. 1953. ii, 24p. diagrs., photo., 2 tabs. (NACA Rept. 1151. Formerly TN 2781)

FREE-FLIGHT-TUNNEL INVESTIGATION OF THE LOW-SPEED STABILITY AND CONTROL CHARACTERISTICS OF A MODEL HAVING A FUSELAGE OR RELATIVELY FLAT CROSS SECTION. John W. Paulson and Joseph L. Johnson, Jr. February 1953. 30p. diagrs., photo., tab. (NACA RM L52L22)



## Directional Control (Cont.)

DYNAMIC STABILITY AND CONTROL CHARACTERISTICS OF A CASCADE-WING VERTICALLY RISING AIRPLANE MODEL IN TAKE-OFFS, LANDINGS, AND HOVERING FLIGHT. Marion O. McKinney, Louis P. Tosti and Edwin E. Davenport. June 1954. 45p. diags., photos., tab. (NACA TN 3198)

STEADY PROPERLY-BANKED TURNS OF TURBOJET-PROPELLED AIRPLANES. (La Virata Corretta Stazionaria Degli Aeroplani Azionati da Turboreattori). Angelo Miele. March 1955. 33p. diags., tab. (NACA TM 1382. Trans. from Rivista Aeronautica, v.27, no.1, 1951, p.23-35)

HOVERING FLIGHT TESTS OF A FOUR-ENGINE-TRANSPORT VERTICAL TAKE-OFF AIRPLANE MODEL UTILIZING A LARGE FLAP AND EXTENSIBLE VANES FOR REDIRECTING THE PROPELLER SLIPSTREAM. Louis P. Tosti and Edwin E. Davenport. May 1955. 26p. diags., photos., tab. (NACA TN 3440)

## AIR BRAKES (1.8.2.4)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE. D-558-1 SPEED-REDUCTION BRAKE AND SYMMETRICAL-PROFILE WING CHARACTERISTICS. John B. Wright. June 15, 1948. 22p. diags., tab. (NACA RM L8B06)

FORCE, STATIC LONGITUDINAL STABILITY, AND CONTROL CHARACTERISTICS OF A 1/16-SCALE MODEL OF THE BELL XS-1 TRANSONIC RESEARCH AIRPLANE AT HIGH MACH NUMBERS. Axel T. Mattson and Donald L. Loving. June 23, 1948. 49p. diags., tab. (NACA RM L8A12)

STABILITY CHARACTERISTICS AT LOW SPEED OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL WITH VARIOUS MODIFICATIONS TO THE BASIC MODEL CONFIGURATIONS. Robert E. Becht and Albert G. Few, Jr. August 16, 1950. 47p. diags., photo. (NACA RM L50F23)

LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS AT HIGH-SUBSONIC SPEEDS OF TWO MODELS OF A TRANSONIC RESEARCH AIRPLANE WITH WINGS AND HORIZONTAL TAILS OF ASPECT RATIOS 4.2 AND 2. Arvo A. Luoma and John B. Wright. September 29, 1950. 134p. diags., photos., 3 tabs. (NACA RM L50H07)

STABILITY AND CONTROL CHARACTERISTICS OF A 1/4-SCALE BELL X-5 AIRPLANE MODEL IN THE LANDING CONFIGURATION. Robert E. Becht. December 18, 1950. 38p. diags., photos. (NACA RM L50J27)

EFFECTS OF A FUSELAGE FLAP DIVE BRAKE ON THE AERODYNAMIC CHARACTERISTICS OF 1/30-SCALE SEMISPAN MODEL OF THE BELL X-5 VARIABLE-SWEEP AIRPLANE AT A MACH NUMBER 1.24 AS DETERMINED BY THE NACA WING-FLOW METHOD. Robert M. Kennedy. February 8, 1951. 15p. diags., photos., tab. (NACA RM L50L11a)

## HINGE MOMENTS (1.8.2.5)

FLIGHT-TEST MEASUREMENTS OF AILERON CONTROL SURFACE BEHAVIOUR AT SUPERCRITICAL MACH NUMBERS. Harvey H. Brown, George A. Rathert, Jr. and Lawrence A. Clousing. April 23, 1947. 26p. diags., photos., 2 tabs. (NACA RM A7A15)

HIGH-SPEED WIND-TUNNEL TESTS OF A MODEL PURSUIT AIRPLANE AND CORRELATION WITH FLIGHT-TEST RESULTS. Joseph W. Cleary and Lyle J. Gray. January 21, 1948. 56p. diags., photos. (NACA RM A7I16)

MEASUREMENTS OF AERODYNAMIC CHARACTERISTICS OF A 35° SWEEPBACK NACA 65-009 AIR-FOIL MODEL WITH 1/4-CHORD HORN-BALANCED FLAP BY THE NACA WING-FLOW METHOD. Harold I. Johnson and B. Porter Brown. April 18, 1949. 59p. diags., photo. (NACA RM L9B23a)

WIND-TUNNEL INVESTIGATION AT HIGH SUBSONIC SPEEDS OF THE LATERAL-CONTROL CHARACTERISTICS OF AN AILERON AND A STEPPED SPOILER ON A WING WITH LEADING EDGE SWEEP BACK 51.3°. Leslie E. Schreiter and John R. Hagerman. June 7, 1949. 34p. diags., photo. (NACA RM L9D06)

MEASUREMENTS OF AERODYNAMIC CHARACTERISTICS OF A 35° SWEEPBACK NACA 65-009 AIR-FOIL MODEL WITH 1/4-CHORD BEVELLED-TRAILING-EDGE FLAP AND TRIM TAB BY THE NACA WING-FLOW METHOD. Harold I. Johnson and B. Porter Brown. January 6, 1950. 68p. diags., photo. (NACA RM L9K11)

INVESTIGATION AT HIGH SUBSONIC SPEEDS OF A 45° SWEEPBACK HORIZONTAL TAIL WITH PLAIN AND HORN-BALANCED CONTROL SURFACES. Harold S. Johnson and Robert F. Thompson. March 31, 1950. 44p. diags., photo., tab. (NACA RM L50B13)

FLIGHT INVESTIGATION OF THE AILERON CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE (BUAERO NO. 37972) AT MACH NUMBERS BETWEEN 0.6 AND 0.89. Jim Rogers Thompson, William S. Roden and John M. Eggleston. May 26, 1950. 23p. diags., photos., tab. (NACA RM L50D20)

MEASUREMENTS OF AERODYNAMIC CHARACTERISTICS OF A 35° SWEEPBACK NACA 65-009 AIR-FOIL MODEL WITH 1/4-CHORD FLAP HAVING A 31-PERCENT-FLAP-CHORD OVERHANG BALANCE BY THE NACA WING-FLOW METHOD. Harold I. Johnson and Harold R. Goodman. September 25, 1950. 38p. diags., photo. (NACA RM L50H09)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.29 OF AN UNSWEEP TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS - TRAILING-EDGE FLAPS DEFLECTED. Louis S. Stivers, Jr. and Alexander W. Malick. December 13, 1950. 45p. diags., photo., 5 tabs. (NACA RM A50J09b)



## Hinge Moments - Control (Cont.)

INVESTIGATION OF A 42.7° SWEPTBACK WING MODEL TO DETERMINE THE EFFECTS OF TRAILING-EDGE THICKNESS ON THE AILERON HINGE-MOMENT AND FLUTTER CHARACTERISTICS AT TRANSONIC SPEEDS. Robert F. Thompson. December 26, 1950. 42p. diagrs., photos., 2 tabs. (NACA RM L50J06)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A 60° DELTA WING EQUIPPED WITH A TRIANGULAR PLAN-FORM CONTROL HAVING A SKEWED HINGE AXIS AND AN OVERHANG BALANCE. TRANSONIC-BUMP METHOD. Harleth G. Wiley. February 6, 1951. 31p. diagrs. (NACA RM L50L01)

WIND-TUNNEL INVESTIGATION AT MACH NUMBERS FROM 0.50 TO 1.29 OF AN UNSWEPT, TAPERED WING OF ASPECT RATIO 2.67 WITH LEADING- AND TRAILING-EDGE FLAPS - LEADING-EDGE FLAPS DEFLECTED. Louis S. Stivers, Jr. and Alexander W. Malick. February 26, 1951. 37p. diagrs., photo., 5 tabs. (NACA RM A50K10)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEPTBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP-TYPE CONTROL. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and Joseph E. Fikes. August 1951. 35p. diagrs. (NACA RM L51F06a)

THE EFFECT OF RAKING THE AILERON TIPS ON THE LATERAL-CONTROL AND HINGE-MOMENT CHARACTERISTICS OF A 20-PERCENT-CHORD PARTIAL-SPAN OUTBOARD AILERON ON A WING WITH LEADING EDGE SWEPT BACK 51.3°. Alexander D. Hammond. November 1951. 41p. diagrs., photo., tab. (NACA RM L51H29)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEPTBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP TYPE OF CONTROL WITH OVERHANG BALANCE. TRANSONIC-BUMP METHOD. Vernard E. Lockwood and John R. Hagerman. January 1952. 24p. diagrs. (NACA RM L51L11)

PRELIMINARY INVESTIGATION OF THE EFFECTS OF A PADDLE BALANCE ON THE CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45.58° SWEPTBACK WING OF ASPECT RATIO 3 HAVING A FULL-SPAN FLAP-TYPE CONTROL. William C. Moseley, Jr. February 1952. 24p. diagrs., photo. (NACA RM L51L19)

HINGE-MOMENT AND OTHER AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A QUARTER-SPAN SPOILER ON A TAPERED 45° SWEPTBACK WING OF ASPECT RATIO 3. Joseph E. Fikes. February 1952. 22p. diagrs., photo. (NACA RM L52A03)

PRELIMINARY INVESTIGATION OF CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A TAPERED 45° SWEPTBACK WING OF ASPECT RATIO 3 HAVING A HORN-BALANCED FULL-SPAN CONTROL. John G. Lowry and Joseph E. Fikes. April 1952. 22p. diagrs., photo. (NACA RM L52A11)

PRELIMINARY INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECT OF BALANCING TABS ON THE HINGE-MOMENT AND OTHER AERODYNAMIC CHARACTERISTICS OF A FULL-SPAN FLAP ON A TAPERED 45° SWEPTBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. April 1952. 27p. diagrs., photo., (NACA RM L52A23)

AN INVESTIGATION OF LONGITUDINAL CONTROL CHARACTERISTICS OF A WING-TIP CONTROL SURFACE ON A SWEPTBACK WING AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. James P. Trant, Jr. June 1952. 23p. diagrs., photos., tab. (NACA RM L52B15a)

CONTROL CHARACTERISTICS AT TRANSONIC SPEEDS OF A LINKED FLAP AND SPOILER ON A TAPERED 45° SWEPTBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. July 1952. 24p. diagrs., photo. (NACA RM L52D25)

CONTROL EFFECTIVENESS AND HINGE-MOMENT CHARACTERISTICS AT LOW SPEED OF LARGE-CHORD, HORN-BALANCED, FLAP-TYPE CONTROLS ON A TRIANGULAR WING OF ASPECT RATIO 2. Jules B. Dods, Jr. August 1952. 53p. diagrs., photos., 2 tabs. (NACA RM A52F13)

HINGE-MOMENT AND CONTROL-EFFECTIVENESS CHARACTERISTICS OF AN OUTBOARD FLAP WITH AN OVERHANG NOSE BALANCE ON A TAPERED 35° SWEPTBACK WING OF ASPECT RATIO 4. TRANSONIC-BUMP METHOD. Robert F. Thompson and William C. Moseley, Jr. August 1952. 51p. diagrs. (NACA RM L52G08)

AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF A 60° DELTA WING EQUIPPED WITH A CONSTANT-CHORD FLAP-TYPE CONTROL WITH AND WITHOUT AN UNSHIELDED HORN BALANCE. TRANSONIC-BUMP METHOD. Harleth G. Wiley and Leon Zontek. September 1952. 25p. diagrs. (NACA RM L51H22)

FLIGHT MEASUREMENTS OF THE LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A HIGH-SPEED FIGHTER AIRPLANE. H. L. Crane, A. R. Beckhardt and C. E. Matheny. September 1952. 50p. diagrs., tab. (NACA RM L52B14)

THE EFFECT OF VARIOUS AERODYNAMIC BALANCES ON THE LOW-SPEED LATERAL-CONTROL AND HINGE-MOMENT CHARACTERISTICS OF A 0.20-CHORD PARTIAL-SPAN OUTBOARD AILERON ON A WING WITH LEADING EDGE SWEPT BACK 51.3°. Alexander D. Hammond. September 1952. 40 p. diagrs., photo., tab. (NACA RM L52G03)

INVESTIGATION AT TRANSONIC SPEEDS OF THE EFFECT OF A POSITIVE-LIFT BALANCING TAB ON THE HINGE-MOMENT AND LIFT CHARACTERISTICS OF A FULL-SPAN FLAP ON A TAPERED 45° SWEPTBACK WING OF ASPECT RATIO 3. Vernard E. Lockwood and Joseph E. Fikes. November 1952. 22p. diagrs., photo. (NACA RM L52J09)

MEASUREMENTS OF AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF AN UNSWEPT AND UNTAPERED NACA 65-009 AIR-FOIL MODEL OF ASPECT RATIO 3 WITH 1/4-CHORD PLAIN FLAP BY THE NACA WING-FLOW METHOD. Harold I. Johnson. June 1953. 35p. diagrs., photo. (NACA RM L53D21)



## Hinge Moments - Control (Cont.)

EFFECTS OF RATE OF FLAP DEFLECTION ON FLAP HINGE MOMENT AND WING LIFT THROUGH THE MACH NUMBER RANGE FROM 0.32 TO 0.87. Thomas R. Turner. June 1953. 29p. diagrs., photos. (NACA RM L53E11)

INVESTIGATION AT TRANSONIC SPEEDS OF THE HINGE-MOMENT AND LIFT-EFFECTIVENESS CHARACTERISTICS OF A SINGLE FLAP AND A TANDEM FLAP ON A 60° DELTA WING. Delwin R. Croom and Harleth G. Wiley. July 1953. 16p. diagrs. (NACA RM L53E28a)

LOW-SPEED INVESTIGATION OF THE LATERAL CONTROL CHARACTERISTICS OF THREE TIP ALLENS ON A 60° TRIANGULAR WING. Stanley M. Gottlieb. August 1953. 24p. diagrs., photo. (NACA RM L53F16a)

THE AERODYNAMIC CHARACTERISTICS AT TRANSONIC SPEEDS OF AN ALL-MOVABLE, TAPERED, 45° SWEEPBACK, ASPECT-RATIO-4 TAIL DEFLECTED ABOUT A SKEWED HINGE AXIS AND EQUIPPED WITH AN INSET UNBALANCING TAB. James M. Watson. September 1953. 40p. diagrs. (NACA RM L53H13)

## AUTOMATIC CONTROL (1.8.2.6)

THEORETICAL ANALYSIS OF THE ROLLING MOTIONS OF AIRCRAFT USING A FLICKER-TYPE AUTOMATIC ROLL STABILIZATION SYSTEM HAVING A DISPLACEMENT-PLUS-RATE RESPONSE. Howard J. Curfman, Jr. January 12, 1949. 29p. diagrs., 2 tabs. (NACA RM L8K23a)

AN EXPERIMENTAL INVESTIGATION OF A GYRO-ACTUATED ROLL CONTROL SYSTEM INSTALLED IN A SUBSONIC TEST VEHICLE. Jerome M. Teitelbaum and Ernest C. Seaberg. April 20, 1949. 26p. diagrs., photos., tab. (NACA RM L9B24a)

LABORATORY INVESTIGATION OF AN AUTOPILOT UTILIZING A MECHANICAL LINKAGE WITH A DEAD SPOT TO OBTAIN AN EFFECTIVE RATE SIGNAL. Ernest C. Seaberg. August 17, 1949. 29p. diagrs., photos., tab. (NACA RM L9F15a)

A THEORETICAL INVESTIGATION OF THE INFLUENCE OF AUXILIARY DAMPING IN PITCH ON THE DYNAMIC CHARACTERISTICS OF A PROPORTIONALLY CONTROLLED SUPERSONIC CANARD MISSILE CONFIGURATION. Walter C. Nelson and Anthony L. Passera. August 25, 1950. 46p. diagrs., photo., 3 tabs. (NACA RM L50F30)

THEORETICAL INVESTIGATION OF AN AUTOMATIC CONTROL SYSTEM WITH PRIMARY SENSITIVITY TO NORMAL ACCELERATIONS AS USED TO CONTROL A SUPERSONIC CANARD MISSILE CONFIGURATION. Ernest C. Seaberg and Earl F. Smith. July 1951. 48p. diagrs., photo., 3 tabs. (NACA RM L51D23)

SYSTEM ANALYSES AND AUTOPILOT DESIGN FOR AUTOMATIC ROLL STABILIZATION OF A SUPERSONIC PILOTLESS AIRCRAFT. Jacob Zarovsky. July 1951. 55p. diagrs., tab. (NACA RM L51E07)

A THEORETICAL INVESTIGATION OF THE INFLUENCE OF AUTOPILOT NATURAL FREQUENCY UPON THE DYNAMIC PERFORMANCE CHARACTERISTICS OF A SUPERSONIC CANARD MISSILE CONFIGURATION WITH A PITCH-ATTITUDE CONTROL SYSTEM. Anthony L. Passera. October 1951. 32p. diagrs., photos., 2 tabs. (NACA RM L51H02)

A THEORETICAL INVESTIGATION OF THE EFFECT OF A TARGET SEEKER SENSITIVE TO PITCH ATTITUDE ON THE DYNAMIC STABILITY AND RESPONSE CHARACTERISTICS OF A SUPERSONIC CANARD MISSILE CONFIGURATION. Ordway B. Gates, Jr. and Albert A. Schy. August 1952. 54p. diagrs., photo., tab. (NACA RM L52E19)

THE EFFECT OF CONTROL-SURFACE-SERVO NATURAL FREQUENCY ON THE DYNAMIC PERFORMANCE CHARACTERISTICS OF AN ACCELERATION CONTROL SYSTEM APPLIED TO A SUPERSONIC MISSILE. Anthony L. Passera and Martin L. Nason. September 1953. 28p. diagrs., 3 tabs. (NACA RM L53G23a)

THEORETICAL INVESTIGATION OF LONGITUDINAL RESPONSE CHARACTERISTICS OF A SWEEP-WING FIGHTER AIRPLANE HAVING A NORMAL-ACCELERATION CONTROL SYSTEM AND A COMPARISON WITH OTHER TYPES OF SYSTEMS. Fred H. Stokes and Charles W. Mathews. July 1954. 50p. diagrs., tab. (NACA TN 3191)

THEORETICAL ANALYSIS OF AN AIRPLANE ACCELERATION RESTRICTOR CONTROLLED BY NORMAL ACCELERATION, PITCHING ACCELERATION, AND PITCHING VELOCITY. Christopher C. Kraft, Jr. September 1954. 42p. diagrs., 3 tabs. (NACA TN 3243)

OPERATING CHARACTERISTICS OF AN ACCELERATION RESTRICTOR AS DETERMINED BY MEANS OF A SIMULATOR. Arthur Assadourian. December 1954. 20p. diagrs., photos. (NACA TN 3319)

USE OF NONLINEARITIES TO COMPENSATE FOR THE EFFECTS OF A RATE-LIMITED SERVO ON THE RESPONSE OF AN AUTOMATICALLY CONTROLLED AIRCRAFT. Stanley F. Schmidt and William C. Triplett. January 1955. 27p. diagrs., tab. (NACA TN 3387)

FLIGHT TESTING BY RADIO REMOTE CONTROL - FLIGHT EVALUATION OF A BEEP-CONTROL SYSTEM. Howard L. Turner, John S. White and Rudolph D. Van Dyke, Jr. March 1955. 55p. diagrs., photos., tab. (NACA TN 3496. Formerly RM A52A29)

THEORETICAL INVESTIGATION OF A PROPORTIONAL-PLUS-FLICKER AUTOMATIC PILOT. Ernest C. Seaberg. May 1955. 53p. diagrs., photo., tab. (NACA TN 3427. Formerly RM L50I19)



**SPINNING****(1.8.3)**

AN INVESTIGATION OF THE SPIN, RECOVERY, AND TUMBLING CHARACTERISTICS OF A 1/20-SCALE MODEL OF THE NORTHROP X-4 AIRPLANE. Lawrence J. Gale, Ira P. Jones, Jr. and Jack H. Wilson. January 4, 1950. 27p. diagrs., photos., 4 tabs. (NACA RM L9K28)

SPIN-TUNNEL INVESTIGATION OF A MODEL OF A 60° DELTA-WING AIRPLANE TO DETERMINE THE SPIN, RECOVERY, AND LONGITUDINAL TRIM CHARACTERISTICS THROUGHOUT AN EXTENSIVE RANGE OF MASS LOADINGS. Walter J. Klinar and Ira P. Jones, Jr. February 15, 1950. 56p. diagrs., photos., 6 charts, 4 tabs. (NACA RM L9L06)

SPIN AND RECOVERY CHARACTERISTICS OF A MODEL OF A FIGHTER TYPE OF AIRPLANE WITHOUT A HORIZONTAL TAIL AND HAVING EITHER A SINGLE VERTICAL TAIL OR TWIN VERTICAL TAILS. Lawrence J. Gale and Norman E. Pumphrey. July 25, 1950. 23p. diagrs., photos., 2 tabs. (NACA RM L50F19a)

SPIN-TUNNEL INVESTIGATION OF A MODEL OF A SWEEP-WING FIGHTER AIRPLANE OVER A WIDE RANGE OF FUSELAGE-HEAVY LOADINGS. Theodore Berman. December 27, 1950. 51p. diagrs., photos., 2 tabs. (NACA RM L50L08)

STATIC LONGITUDINAL STABILITY AND DYNAMIC CHARACTERISTICS AT HIGH ANGLES OF ATTACK AND AT LOW REYNOLDS NUMBERS OF A MODEL OF THE X-3 SUPERSONIC RESEARCH AIRPLANE. Sanger M. Burk, Jr. and Burton E. Hultz. February 6, 1951. 76p. diagrs., photos., 4 tabs. (NACA RM L50L19)

EFFECT OF CURRENT DESIGN TRENDS ON AIRPLANE SPINS AND RECOVERIES. Anshal I. Neihouse. January 1952. 6p. diagrs. (NACA RM L52A09)

AN ANALYTICAL INVESTIGATION OF AIRPLANE SPIN-RECOVERY MOTION BY USE OF ROTARY-BALANCE AERODYNAMIC DATA. Stanley H. Scher. June 1954. 38p. diagrs., tab. (NACA TN 3188)

ANALYTICAL DETERMINATION OF THE MECHANISM OF AN AIRPLANE SPIN RECOVERY WITH DIFFERENT APPLIED YAWING MOMENTS BY USE OF ROTARY-BALANCE DATA. Sanger M. Burk, Jr. December 1954. 43p. diagrs., 2 tabs. (NACA TN 3321)

**STALLING****(1.8.4)**

DRAG MEASUREMENTS OF A SWEEP-BACK WING HAVING INVERSE TAPER AS DETERMINED BY FLIGHT TESTS AT SUPERSONIC SPEEDS. Sidney R. Alexander. April 8, 1947. 12p. diagrs., photo. (NACA RM L6L30)

MEASUREMENTS OF THE WING AND TAIL LOADS DURING THE ACCEPTANCE TESTS OF BELL XS-1 RESEARCH AIRPLANE. De E. Beeler and John P. Mayer. April 13, 1948. 25p. diagrs., photos., 2 tabs. (NACA RM L7L12)

GENERAL HANDLING-QUALITIES RESULTS OBTAINED DURING ACCEPTANCE FLIGHT TESTS OF THE BELL XS-1 AIRPLANE. Walter C. Williams, Charles M. Forsyth and Beverly P. Brown. April 19, 1948. 72p. diagrs., photos., tab. (NACA RM L8A09)

LANDING CHARACTERISTICS OF HIGH-SPEED WINGS. Herbert A. Wilson, Jr. and Laurence K. Loftin, Jr. September 21, 1948. 21p. diagrs. (NACA RM L8A28e)

MAXIMUM-LIFT INVESTIGATION AT MACH NUMBERS FROM 0.05 TO 1.20 OF A WING WITH LEADING EDGE SWEEP BACK 42°. Thomas R. Turner. February 14, 1950. 21p. diagrs. (NACA RM L9K03)

STALL CHARACTERISTICS OBTAINED FROM FLIGHT 10 OF NORTHROP X-4 NO. 2 AIRPLANE (USAF NO. 46-677). Melvin Sadoff and Thomas R. Sisk. February 27, 1950. 25p. diagrs., photos., tab. (NACA RM A50A04)

MAXIMUM-LIFT INVESTIGATION OF A 1/40-SCALE X-1 AIRPLANE WING AT MACH NUMBERS FROM 0.60 TO 1.15. Thomas R. Turner. April 21, 1950. 18p. diagrs. (NACA RM L50C28)

EFFECTS OF SWEEP ON THE MAXIMUM-LIFT CHARACTERISTICS OF FOUR ASPECT-RATIO-4 WINGS AT TRANSONIC SPEEDS. Thomas R. Turner. October 3, 1950. 25p. diagrs. (NACA RM L50H11)

SUMMARY REPORT OF RESULTS OBTAINED DURING DEMONSTRATION TESTS OF THE NORTHROP X-4 AIRPLANES. Melvin Sadoff and Thomas R. Sisk. December 13, 1950. 46p. diagrs., photos., tab. (NACA RM A50I01)

EFFECT OF A DEFLECTABLE WING-TIP CONTROL ON THE LOW-SPEED LATERAL AND LONGITUDINAL CHARACTERISTICS OF A LARGE-SCALE WING WITH THE LEADING EDGE SWEEP BACK 47.5°. Roy H. Lange and Marvin P. Fink. April 26, 1951. 41p. diagrs., photo., 2 tabs. (NACA RM L51C07)

FLIGHT DETERMINATION OF THE EFFECTS OF WING VORTEX GENERATORS ON THE AERODYNAMIC CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE. De E. Beeler, Donald R. Bellman and John H. Griffith. August 14, 1951. 23p. diagrs., photos., tab. (NACA RM L51A23)

STABILITY AND CONTROL MEASUREMENTS OBTAINED DURING USAF-NACA COOPERATIVE FLIGHT-TEST PROGRAM ON THE X-4 AIRPLANE (USAF NO. 46-677). Melvin Sadoff, Herman O. Ankenbruck and William O'Hare. October 1951. 38p. diagrs., photos., tab. (NACA RM A51H09)

FULL-SCALE WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF WING MODIFICATIONS AND HORIZONTAL-TAIL LOCATION ON THE LOW-SPEED STATIC LONGITUDINAL CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE. Ralph L. Maki. April 1952. 54p. diagrs., photos., 7 tabs. (NACA RM A52B05)



## Stalling (Cont.)

PRELIMINARY STUDY OF SOME FACTORS WHICH AFFECT THE STALL-FLUTTER CHARACTERISTICS OF THIN WINGS. A. Gerald Rainey. July 1952. 33p. diags., photo., tab. (NACA RM L52D08)

SOME OBSERVATIONS ON STALL FLUTTER AND BUFFETING. A. Gerald Rainey. June 1953. 11p. diags. (NACA RM L53E15)

METHOD FOR CALCULATING THE ROLLING AND YAWING MOMENTS DUE TO ROLLING FOR UNSWEPT WINGS WITH OR WITHOUT FLAPS OR AILERONS BY USE OF NONLINEAR SECTION LIFT DATA. Albert P. Martina. 1954. ii, 16p. diags., 11 tabs. (NACA Rept. 1167. Formerly TN 2937)

PRELIMINARY INVESTIGATION OF A STICK SHAKER AS A LIFT-MARGIN INDICATOR. James P. Trant, Jr. February 1955. 19p. diags., photos. (NACA TN 3355)

## FLYING QUALITIES (1.8.5)

GENERAL HANDLING-QUALITIES RESULTS OBTAINED DURING ACCEPTANCE FLIGHT TESTS OF THE BELL XS-1 AIRPLANE. Walter C. Williams, Charles M. Forsyth and Beverly P. Brown. April 19, 1948. 72p. diags., photos., tab. (NACA RM L8A09)

FACTORS AFFECTING LATERAL STABILITY AND CONTROLLABILITY. John P. Campbell and Thomas A. Toll. May 13, 1948. 19p. diags. (NACA RM L8A28a)

THEORETICAL INVESTIGATION OF THE DYNAMIC LATERAL STABILITY CHARACTERISTICS OF DOUGLAS DESIGN NO. 39C, AN EARLY VERSION OF THE X-3 RESEARCH AIRPLANE. Charles V. Bennett. January 18, 1949. 39p. diags., 2 tabs. (NACA RM L8L31)

STABILITY AND CONTROL DATA OBTAINED FROM FIRST FLIGHT OF X-4 AIRPLANE. Hubert M. Drake. February 7, 1949. 11p. diags., photos., tab. (NACA RM L9A31)

STABILITY RESULTS OBTAINED WITH DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN FLIGHT UP TO A MACH NUMBER OF 0.89. William H. Barlow and Howard C. Lilly. April 22, 1949. 16p. diags., photos. (NACA RM L8K03)

MEASUREMENT OF THE DYNAMIC LATERAL STABILITY OF THE DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN RUDDER KICKS AT A MACH NUMBER OF 0.72. Hubert M. Drake. May 31, 1949. 10p. diags., photos. (NACA RM L9D06a)

RESULTS OBTAINED FROM SECOND FLIGHT OF X-4 AIRPLANE (A.F. NO. 46-676). Walter C. Williams. July 18, 1949. 13p. diags., photos., tab. (NACA RM L9F21)

STABILITY AND CONTROL DATA OBTAINED FROM FOURTH AND FIFTH FLIGHTS OF THE NORTHROP X-4 AIRPLANE (A.F. NO. 46-676). George M. Valentine. August 4, 1949. 22p. diags., photos., tab. (NACA RM L9G25a)

RESULTS OBTAINED FROM THIRD FLIGHT OF NORTHROP X-4 AIRPLANE (A.F. NO. 46-676). Walter C. Williams. September 9, 1949. 13p. diags., photos., tab. (NACA RM L9G20a)

A STUDY OF THE DYNAMIC STABILITY OF THE BELL X-1 RESEARCH AIRPLANE. Edward C. Polhamus. January 10, 1950. 16p. diags., tab. (NACA RM L9K04a)

RESULTS OBTAINED DURING FLIGHTS 1 TO 6 OF THE NORTHROP X-4 AIRPLANE (A.F. NO. 46-677). James T. Matthews, Jr. January 12, 1950. 19p. diags., photos., tab. (NACA RM L9K22)

STALL CHARACTERISTICS OBTAINED FROM FLIGHT 10 OF NORTHROP X-4 NO. 2 AIRPLANE (USAF NO. 46-677). Melvin Sadoff and Thomas R. Sisk. February 27, 1950. 25p. diags., photos., tab. (NACA RM A50A04)

THEORETICAL INVESTIGATION OF THE DYNAMIC LATERAL STABILITY CHARACTERISTICS OF THE DOUGLAS X-3 RESEARCH AIRPLANE, STUDY 41-B. Charles V. Bennett. April 27, 1950. 31p. diags., 3 tabs. (NACA RM L50B28)

FLIGHT INVESTIGATION OF THE AILERON CHARACTERISTICS OF THE DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37972) AT MACH NUMBERS BETWEEN 0.6 AND 0.89. Jim Rogers Thompson, William S. Roden and John M. Eggleston. May 26, 1950. 23p. diags., photos., tab. (NACA RM L50D20)

LONGITUDINAL-STABILITY CHARACTERISTICS OF THE NORTHROP X-4 AIRPLANE (USAF NO. 46-677). Melvin Sadoff and Thomas R. Sisk. June 29, 1950. 24p. diags., photos., tab. (NACA RM A50D27)

EFFECTS ON THE LATERAL OSCILLATION OF FIXING THE RUDDER AND REFLEXING THE FLAPS ON THE BELL X-1 AIRPLANE. Hubert M. Drake. December 11, 1950. 14p. diags., photo. (NACA RM L50I05)

SUMMARY REPORT OF RESULTS OBTAINED DURING DEMONSTRATION TESTS OF THE NORTHROP X-4 AIRPLANES. Melvin Sadoff and Thomas R. Sisk. December 13, 1950. 46p. diags., photos., tab. (NACA RM A50I01)

EFFECTS ON THE SNAKING OSCILLATION OF THE BELL X-1 AIRPLANE OF A TRAILING-EDGE BULB ON THE RUDDER. Hubert M. Drake and Harry P. Clagett. January 16, 1951. 14p. diags., photo. (NACA RM L50K01a)

FLIGHT INVESTIGATION OF THE LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF THE DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37972) AT MACH NUMBERS UP TO 0.89. Melvin Sadoff, William S. Roden and John M. Eggleston. June 1951. 26p. diags., photos., tab. (NACA RM L51D18)



## Flying Qualities (Cont.)

A COMPARISON OF THE MEASURED AND PREDICTED LATERAL OSCILLATORY CHARACTERISTICS OF A 35° SWEEP-WING FIGHTER AIRPLANE. Walter E. McNeill and George E. Cooper. July 1951. 21p. diagrs., 3 tabs. (NACA RM A51C28)

A FLIGHT STUDY OF REQUIREMENTS FOR SATISFACTORY LATERAL OSCILLATORY CHARACTERISTICS OF FIGHTER AIRCRAFT. Charles J. Liddell, Jr., Brent Y. Creer and Rudolph D. Van Dyke, Jr. July 1951. 39p. diagrs., photo., 2 tabs. (NACA RM A51E16)

STABILITY AND CONTROL MEASUREMENTS OBTAINED DURING USAF-NACA COOPERATIVE FLIGHT-TEST PROGRAM ON THE X-4 AIRPLANE (USAF NO. 46-677). Melvin Sadoff, Herman O. Ankenbruck and William O'Hare. October 1951. 38p. diagrs., photos., tab. (NACA RM A51H09)

SOME FLYING-QUALITIES STUDIES OF A TANDEM HELICOPTER. Kenneth B. Amer. October 1951. 29p. diagrs., photos. (NACA RM L51H20a)

LOW-SPEED TESTS OF A FREE-TO-YAW MODEL IN TWO WIND TUNNELS OF DIFFERENT TURBULENCE. Jones F. Cahill and John D. Bird. February 1952. 12p. diagrs., photos. (NACA RM L51L14)

FLIGHT MEASUREMENTS OF THE LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A HIGH-SPEED FIGHTER AIRPLANE. H. L. Crane, A. R. Beckhardt and C. E. Matheny. September 1952. 50p. diagrs., tab. (NACA RM L52B14)

TESTS OF A CENTERING SPRING USED AS AN ARTIFICIAL FEEL DEVICE ON THE ELEVATOR OF A FIGHTER AIRPLANE. James J. Adams and James B. Whitten. September 1952. 18p. diagrs., photo. tab. (NACA RM L52G16)

THE EFFECTS ON DYNAMIC LATERAL STABILITY AND CONTROL OF LARGE ARTIFICIAL VARIATIONS IN THE ROTARY STABILITY DERIVATIVES. Robert O. Schade and James L. Hassell, Jr. 1953. ii, 24p. diagrs., photo., 2 tabs. (NACA Rept. 1151. Formerly TN 2781)

FLIGHT TESTS OF A MAN STANDING ON A PLATFORM SUPPORTED BY A TEETERING ROTOR. Paul R. Hill and T. L. Kennedy. March 1954. 26p. diagrs., photos. (NACA RM L54B12a)

DYNAMIC STABILITY AND CONTROL CHARACTERISTICS OF A CASCADE-WING VERTICALLY RISING AIRPLANE MODEL IN TAKE-OFFS, LANDINGS, AND HOVERING FLIGHT. Marion O. McKinney, Louis P. Tosti and Edwin E. Davenport. June 1954. 45p. diagrs., photos., tab. (NACA TN 3198)

ANALYTICAL DETERMINATION OF THE MECHANISM OF AN AIRPLANE SPIN RECOVERY WITH DIFFERENT APPLIED YAWING MOMENTS BY USE OF ROTARY-BALANCE DATA. Sanger M. Burk, Jr. December 1954. 43p. diagrs., 2 tabs. (NACA TN 3321)

FLIGHT TESTING BY RADIO REMOTE CONTROL - FLIGHT EVALUATION OF A BEEP-CONTROL SYSTEM. Howard L. Turner, John S. White and Rudolph D. Van Dyke, Jr. March 1955. 55p. diagrs., photos., tab. (NACA TN 3496. Formerly RM A52A29)

SOME CALCULATIONS OF THE LATERAL RESPONSE OF TWO AIRPLANES TO ATMOSPHERIC TURBULENCE WITH RELATION TO THE LATERAL SNAKING PROBLEM. John D. Bird. May 1955. 24p. diagrs., 2 tabs. (NACA TN 3425. Formerly RM L50F26a)

HOVERING FLIGHT TESTS OF A FOUR-ENGINE-TRANSPORT VERTICAL TAKE-OFF AIRPLANE MODEL UTILIZING A LARGE FLAP AND EXTENSIBLE VANES FOR REDIRECTING THE PROPELLER SLIPSTREAM. Louis P. Tosti and Edwin E. Davenport. May 1955. 26p. diagrs., photos., tab. (NACA TN 3440)

## MASS AND GYROSCOPIC PROBLEMS (1.8.6)

SUMMARY OF RESULTS OF TUMBLING INVESTIGATIONS MADE IN THE LANGLEY 20-FOOT FREE-SPINNING TUNNEL ON 14 DYNAMIC MODELS. Ralph W. Stone, Jr. and Robert L. Bryant. December 31, 1948. 91p. diagrs., photos., 23 tabs. (NACA RM L8J28)

AN EMPIRICAL CRITERION FOR FIN STABILIZING JETTISONABLE NOSE SECTIONS OF AIRPLANES. Stanley H. Scher. December 8, 1949. 21p. diagrs., photo., tab. (NACA RM L9I28)

AN INVESTIGATION OF THE SPIN, RECOVERY, AND TUMBLING CHARACTERISTICS OF A 1/20-SCALE MODEL OF THE NORTHROP X-4 AIRPLANE. Lawrence J. Gale, Ira P. Jones, Jr. and Jack H. Wilson. January 4, 1950. 27p. diagrs., photos., 4 tabs. (NACA RM L9K28)

SPIN-TUNNEL INVESTIGATION OF A MODEL OF A 60° DELTA-WING AIRPLANE TO DETERMINE THE SPIN, RECOVERY, AND LONGITUDINAL TRIM CHARACTERISTICS THROUGHOUT AN EXTENSIVE RANGE OF MASS LOADINGS. Walter J. Klinar and Ira P. Jones, Jr. February 15, 1950. 56p. diagrs., photos., 6 charts, 4 tabs. (NACA RM L9L06)

SPIN AND RECOVERY CHARACTERISTICS OF A MODEL OF A FIGHTER TYPE OF AIRPLANE WITHOUT A HORIZONTAL TAIL AND HAVING EITHER A SINGLE VERTICAL TAIL OR TWIN VERTICAL TAILS. Lawrence J. Gale and Norman E. Pumphrey. July 25, 1950. 23p. diagrs., photos., 2 tabs. (NACA RM L50F19a)

PRELIMINARY EMPIRICAL DESIGN REQUIREMENTS FOR THE PREVENTION OF TUMBLING OF AIRPLANES HAVING NO HORIZONTAL TAILS. Robert L. Bryant. October 11, 1950. 23p. diagrs., 2 tabs. (NACA RM L50H23)

EFFECTS ON THE LATERAL OSCILLATION OF FIXING THE RUDDER AND REFLEXING THE FLAPS ON THE BELL X-1 AIRPLANE. Hubert M. Drake. December 11, 1950. 14p. diagrs., photo. (NACA RM L50I05)

SPIN-TUNNEL INVESTIGATION OF A MODEL OF A SWEEP-WING FIGHTER AIRPLANE OVER A WIDE RANGE OF FUSELAGE-HEAVY LOADINGS. Theodore Berman. December 27, 1950. 51p. diagrs., photos., 2 tabs. (NACA RM L50L08)



## Mass and Gyroscopic Problems (Cont.)

STATIC LONGITUDINAL STABILITY AND DYNAMIC CHARACTERISTICS AT HIGH ANGLES OF ATTACK AND AT LOW REYNOLDS NUMBERS OF A MODEL OF THE X-3 SUPERSONIC RESEARCH AIRPLANE. Sanger M. Burk, Jr. and Burton E. Hultz. February 6, 1951. 76p. diagrs., photos., 4 tabs. (NACA RM L50L19)

THE EFFECT OF MASS DISTRIBUTION ON THE LOW-SPEED DYNAMIC LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A MODEL WITH A 60° TRIANGULAR WING. Joseph L. Johnson. March 9, 1951. 23p. diagrs., 2 tabs. (NACA RM L50K10)

EFFECT OF CURRENT DESIGN TRENDS ON AIRPLANE SPINS AND RECOVERIES. Anshal I. Neihouse. January 1952. 6p. diagrs. (NACA RM L52A09)

ANALYTICAL DETERMINATION OF THE MECHANISM OF AN AIRPLANE SPIN RECOVERY WITH DIFFERENT APPLIED YAWING MOMENTS BY USE OF ROTARY-BALANCE DATA. Sanger M. Burk, Jr. December 1954. 43p. diagrs., 2 tabs. (NACA TN 3321)

EFFECTIVE MOMENT OF INERTIA OF FLUID IN OFFSET, INCLINED, AND SWEEP-WING TANKS UNDERGOING PITCHING OSCILLATIONS. James R. Reese and John L. Sewall. January 1955. 27p. diagrs., 6 tabs. (NACA TN 3353)

## TUMBLING (1.8.7)

SUMMARY OF RESULTS OF TUMBLING INVESTIGATIONS MADE IN THE LANGLEY 20-FOOT FREE-SPINNING TUNNEL ON 14 DYNAMIC MODELS. Ralph W. Stone, Jr. and Robert L. Bryant. December 31, 1948. 91p. diagrs., photos., 23 tabs. (NACA RM L8J28)

AN INVESTIGATION OF THE SPIN, RECOVERY, AND TUMBLING CHARACTERISTICS OF A 1/20-SCALE MODEL OF THE NORTHROP X-4 AIRPLANE. Lawrence J. Gale, Ira P. Jones, Jr. and Jack H. Wilson. January 4, 1950. 27p. diagrs., photos., 4 tabs. (NACA RM L9K28)

PRELIMINARY EMPIRICAL DESIGN REQUIREMENTS FOR THE PREVENTION OF TUMBLING OF AIRPLANES HAVING NO HORIZONTAL TAILS. Robert L. Bryant. October 11, 1950. 23p. diagrs., 2 tabs. (NACA RM L50H23)

## AUTOMATIC STABILIZATION (1.8.8)

A THEORETICAL INVESTIGATION OF THE INFLUENCE OF AUXILIARY DAMPING IN PITCH ON THE DYNAMIC CHARACTERISTICS OF A PROPORTIONALLY CONTROLLED SUPERSONIC CANARD MISSILE CONFIGURATION. Walter C. Nelson and Anthony L. Passera. August 25, 1950. 46p. diagrs., photo., 3 tabs. (NACA RM L50F30)

THEORETICAL INVESTIGATION OF AN AUTOMATIC CONTROL SYSTEM WITH PRIMARY SENSITIVITY TO NORMAL ACCELERATIONS AS USED TO CONTROL A SUPERSONIC CANARD MISSILE CONFIGURATION. Ernest C. Seaberg and Earl F. Smith. July 1951. 48p. diagrs., photo., 3 tabs. (NACA RM L51D23)

SYSTEM ANALYSES AND AUTOPILOT DESIGN FOR AUTOMATIC ROLL STABILIZATION OF A SUPERSONIC PILOTLESS AIRCRAFT. Jacob Zarovsky. July 1951. 55p. diagrs., tab. (NACA RM L51E07)

A THEORETICAL INVESTIGATION OF THE INFLUENCE OF AUTOPILOT NATURAL FREQUENCY UPON THE DYNAMIC PERFORMANCE CHARACTERISTICS OF A SUPERSONIC CANARD MISSILE CONFIGURATION WITH A PITCH-ATTITUDE CONTROL SYSTEM. Anthony L. Passera. October 1951. 32p. diagrs., photos., 2 tabs. (NACA RM L51H02)

A THEORETICAL INVESTIGATION OF THE EFFECT OF A TARGET SEEKER SENSITIVE TO PITCH ATTITUDE ON THE DYNAMIC STABILITY AND RESPONSE CHARACTERISTICS OF A SUPERSONIC CANARD MISSILE CONFIGURATION. Ordway B. Gates, Jr. and Albert A. Schy. August 1952. 54p. diagrs., photo., tab. (NACA RM L52E19)

THE EFFECTS ON DYNAMIC LATERAL STABILITY AND CONTROL OF LARGE ARTIFICIAL VARIATIONS IN THE ROTARY STABILITY DERIVATIVES. Robert O. Schade and James L. Hassell, Jr. 1953. ii, 24p. diagrs., photo., 2 tabs. (NACA Rept. 1151. Formerly TN 2781)

THE EFFECT OF CONTROL-SURFACE-SERVO NATURAL FREQUENCY ON THE DYNAMIC PERFORMANCE CHARACTERISTICS OF AN ACCELERATION CONTROL SYSTEM APPLIED TO A SUPERSONIC MISSILE. Anthony L. Passera and Martin L. Nason. September 1953. 28p. diagrs., 3 tabs. (NACA RM L53G23a)

DYNAMIC STABILITY AND CONTROL CHARACTERISTICS OF A CASCADE-WING VERTICALLY RISING AIRPLANE MODEL IN TAKE-OFFS, LANDINGS, AND HOVERING FLIGHT. Marion O. McKinney, Louis P. Tosti and Edwin E. Davenport. June 1954. 45p. diagrs., photos., tab. (NACA TN 3198)

THEORETICAL INVESTIGATION OF LONGITUDINAL RESPONSE CHARACTERISTICS OF A SWEEP-WING FIGHTER AIRPLANE HAVING A NORMAL-ACCELERATION CONTROL SYSTEM AND A COMPARISON WITH OTHER TYPES OF SYSTEMS. Fred H. Stokes and Charles W. Mathews. July 1954. 50p. diagrs., tab. (NACA TN 3191)

USE OF NONLINEARITIES TO COMPENSATE FOR THE EFFECTS OF A RATE-LIMITED SERVO ON THE RESPONSE OF AN AUTOMATICALLY CONTROLLED AIRCRAFT. Stanley F. Schmidt and William C. Triplett. January 1955. 27p. diagrs., tab. (NACA TN 3387)

THEORETICAL INVESTIGATION OF A PROPORTIONAL-PLUS-FLICKER AUTOMATIC PILOT. Ernest C. Seaberg. May 1955. 53p. diagrs., photo., tab. (NACA TN 3427. Formerly RM L50I19)

HOVERING FLIGHT TESTS OF A FOUR-ENGINE-TRANSPORT VERTICAL TAKE-OFF AIRPLANE MODEL UTILIZING A LARGE FLAP AND EXTENSIBLE VANES FOR REDIRECTING THE PROPELLER SLIPSTREAM. Louis P. Tosti and Edwin E. Davenport. May 1955. 26p. diagrs., photos., tab. (NACA TN 3440)



## Aeroelasticity (1.9)

A TORSIONAL STIFFNESS CRITERION FOR PREVENTING FLUTTER OF WINGS OF SUPERSONIC MISSILES. Bernard Budiansky, Joseph N. Kotanchik and Patrick T. Chiarito. August 28, 1947. 14p. diags., tab. (NACA RM L7G02)

EFFECTS OF MACH NUMBER AND SWEEP ON THE DAMPING-IN-ROLL CHARACTERISTICS OF WINGS OF ASPECT RATIO 4. Richard E. Kuhn and Boyd C. Myers, II. June 27, 1949. 28p. diags. photo. (NACA RM L9E10)

WING-FLOW MEASUREMENTS OF LONGITUDINAL STABILITY AND CONTROL CHARACTERISTICS OF A CANARD AIRPLANE CONFIGURATION WITH A 45° SWEEPBACK WING AND A TRIANGULAR ALL-MOVABLE CONTROL SURFACE. Harold L. Crane and James J. Adams. August 25, 1950. 53p. diags., photo. (NACA RM L50A31)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.38 OF FOUR WINGS OF ASPECT RATIO 4 HAVING QUARTER-CHORD SWEEP ANGLES OF 0°, 35°, 45°, AND 60°. William B. Kemp, Jr., Kenneth W. Goodson and Robert A. Booth. October 10, 1950. 41p. diags., photos., tab. (NACA RM L50G14)

DESCRIPTION AND INVESTIGATION OF A DYNAMIC MODEL OF THE XH-17 TWO-BLADE JET-DRIVEN HELICOPTER. George W. Brooks and Maurice A. Sylvester. March 14, 1951. 49p. diags., photos., 6 tabs. (NACA RM L50I21)

FLUTTER INVESTIGATION OF TWO THIN, LOW-ASPECT-RATIO, SWEEP, SOLID, METAL WINGS IN THE TRANSONIC RANGE BY USE OF A FREE-FALLING BODY. W. T. Lauten, Jr. and Maurice A. Sylvester. February 1952. 12p. diags., photo., 2 tabs. (NACA RM L51K28a)

THE CALCULATION OF CERTAIN STATIC AEROELASTIC PHENOMENA OF WINGS WITH TIP TANKS OR BOOM-MOUNTED LIFTING SURFACES. Franklin W. Diederich and Kenneth A. Foss. August 1952. 55p. diags., 2 tabs. (NACA RM L52A22)

FLIGHT MEASUREMENTS OF THE LATERAL STABILITY AND CONTROL CHARACTERISTICS OF A HIGH-SPEED FIGHTER AIRPLANE. H. L. Crane, A. R. Beckhardt and C. E. Matheny. September 1952. 50p. diags., tab.

LATERAL AND DIRECTIONAL DYNAMIC-RESPONSE CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS. William C. Triplett and Stuart C. Brown. December 1952. 62p. diags., photo., 3 tabs. (NACA RM A52I17)

LIFT AND MOMENT EQUATIONS FOR OSCILLATING AIRFOILS IN AN INFINITE UNSTAGGERED CASCADE. Alexander Mendelson and Robert W. Carroll. October 1954. 46p. diags., 3 tabs. (NACA TN 3263)

A THEORETICAL INVESTIGATION OF THE SHORT-PERIOD DYNAMIC LONGITUDINAL STABILITY OF AIRPLANE CONFIGURATIONS HAVING ELASTIC WINGS OF 0° TO 60° SWEEPBACK. Milton D. McLaughlin. December 1954. 39p. diags., 2 tabs. (NACA TN 3251)

DESCRIPTION AND ANALYSIS OF A ROCKET-VEHICLE EXPERIMENT ON FLUTTER INVOLVING WING DEFORMATION AND BODY MOTIONS. H. J. Cunningham and R. R. Lundstrom. January 1955. 26p. diags., photos., 2 tabs. (NACA TN 3311. Formerly RM L50I29)

A SIMPLIFIED METHOD FOR CALCULATING AEROELASTIC EFFECTS ON THE ROLL OF AIRCRAFT. John M. Hedgepeth, Paul G. Waner, Jr. and Robert J. Kell. March 1955. 26p. diags., 4 tabs. (NACA TN 3370)

THE EFFECT OF CONTROL STIFFNESS AND FORWARD SPEED ON THE FLUTTER OF A 1/10-SCALE DYNAMIC MODEL OF A TWO-BLADE JET-DRIVEN HELICOPTER ROTOR. George W. Brooks and Maurice A. Sylvester. April 1955. 38p. diags., photo., 3 tabs. (NACA TN 3376)

METHOD OF CONTROLLING STIFFNESS PROPERTIES OF A SOLID-CONSTRUCTION MODEL WING. Norman S. Land and Frank T. Abbott, Jr. April 1955. 21p. diags., photos., tab. (NACA TN 3423)



## Parachutes (1.10)

SUMMARY OF RESULTS OF TUMBLING INVESTIGATIONS MADE IN THE LANGLEY 20-FOOT FREE-SPINNING TUNNEL ON 14 DYNAMIC MODELS.

Ralph W. Stone, Jr. and Robert L. Bryant.  
December 31, 1948. 91p. diags., photos., 23 tabs.  
(NACA RM L8J28)

AN INVESTIGATION OF THE SPIN, RECOVERY, AND TUMBLING CHARACTERISTICS OF A 1/20-SCALE MODEL OF THE NORTHROP X-4 AIRPLANE. Lawrence J. Gale, Ira P. Jones, Jr. and Jack H. Wilson. January 4, 1950. 27p. diags., photos., 4 tabs. (NACA RM L9K28)

WIND-TUNNEL INVESTIGATION OF THE EFFECTS OF VARIOUS ASYMMETRIC CANOPY MODIFICATIONS ON THE BEHAVIOR OF DESCENDING PARACHUTES. Stanley H. Scher. February 1952. 20p. diags., photos., tab. (NACA RM L51J18)

WIND-TUNNEL INVESTIGATION OF THE BEHAVIOR OF PARACHUTES IN CLOSE PROXIMITY TO ONE ANOTHER. Stanley H. Scher. August 1953. 12p. photos. (NACA RM L53G07)



# HYDRODYNAMICS

(2)



## HYDRODYNAMICS

### (2)

AVERAGE SKIN-FRICTION DRAG COEFFICIENTS FROM TANK TESTS OF A PARABOLIC BODY OF REVOLUTION (NACA RM-10). Elmo J. Mottard and J. Dan Loper. 1954. ii, 7p. diagrs., photos. (NACA Rept. 1161. Formerly TN 2854)

THE HYDRODYNAMIC CHARACTERISTICS OF AN ASPECT-RATIO-0.125 MODIFIED RECTANGULAR FLAT PLATE OPERATING NEAR A FREE WATER SURFACE. John A. Ramsen and Victor L. Vaughan, Jr. October 1954. 32p. diagrs. (NACA TN 3249)

HYDRODYNAMIC TARES AND INTERFERENCE EFFECTS FOR A 12-PERCENT-THICK SURFACE-PIERCING STRUT AND AN ASPECT-RATIO-0.25 LIFTING SURFACE. John A. Ramsen and Victor L. Vaughan, Jr. April 1955. 20p. diagrs. (NACA TN 3420)



## Theory (2.1)

A THEORETICAL AND EXPERIMENTAL INVESTIGATION OF THE LIFT AND DRAG CHARACTERISTICS OF A HYDROFOIL AT SUBCRITICAL AND SUPERCRITICAL SPEEDS. Kenneth L. Wadlin, Charles L. Shuford, Jr. and John R. McGehee. July 1952. 53p. diags., photo., tab. (NACA RM L52D23a)

THEORY AND PROCEDURE FOR DETERMINING LOADS AND MOTIONS IN CHINE-IMMERSED HYDRODYNAMIC IMPACTS OF PRISMATIC BODIES. Emanuel Schnitzer. 1953. ii, 29p. diags. (NACA Rept. 1152. Formerly TN 2813)

EXPERIMENTAL INVESTIGATION OF THE FLOW FIELD BEHIND AN ASPECT-RATIO-10 HYDROFOIL NEAR THE WATER SURFACE. Arthur W. Carter and Roger V. Butler. February 1953. 31p. diags., photos., tab. (NACA RM L52L11)

A REVIEW OF PLANING THEORY AND EXPERIMENT WITH A THEORETICAL STUDY OF PURE-PLANING LIFT OF RECTANGULAR FLAT PLATES. Charles L. Shuford, Jr. August 1954. 34p. diags. (NACA TN 3233)

THE HYDRODYNAMIC CHARACTERISTICS OF AN ASPECT-RATIO-0.125 MODIFIED RECTANGULAR FLAT PLATE OPERATING NEAR A FREE WATER SURFACE. John A. Ramsen and Victor L. Vaughan, Jr. October 1954. 32p. diags. (NACA TN 3249)

ANALYTIC DETERMINATION OF THE DISCHARGE COEFFICIENTS OF FLOW NOZZLES. Frederick S. Simmons. April 1955. 15p. diags. (NACA TN 3447)



## General Arrangement Studies (2.2)

PRELIMINARY TANK TESTS OF NACA HYDRO-SKIS FOR HIGH-SPEED AIRPLANES. John R. Dawson and Kenneth L. Wadlin. November 26, 1947. 19p. diags., photos. (NACA RM L7I04)

TANK SPRAY TESTS OF A JET-POWERED MODEL FITTED WITH NACA HYDRO-SKIS. Kenneth L. Wadlin and John A. Ramsen. July 22, 1948. 19p. diags., photos. (NACA RM L8B18)

THE EFFECT OF REAR CHINE STRIPS ON THE TAKE-OFF CHARACTERISTICS OF A HIGH-SPEED AIRPLANE FITTED WITH NACA HYDRO-SKIS. John A. Ramsen. March 17, 1949. 7p. diags., photo. (NACA RM L9B10a)

A PRELIMINARY INVESTIGATION OF THE STATIC AND DYNAMIC LONGITUDINAL STABILITY OF A GRUMBERG HYDROFOIL SYSTEM. Norman S. Land, Derrill B. Chambliss and William W. Petynia. September 1952. 48p. diags., photos. (NACA RM L52D15)

A REVIEW OF PLANING THEORY AND EXPERIMENT WITH A THEORETICAL STUDY OF PURE-PLANING LIFT OF RECTANGULAR FLAT PLATES. Charles L. Shuford, Jr. August 1954. 34p. diags. (NACA TN 3233)



## Seaplane Hull Variables (2.3)

PRELIMINARY WIND-TUNNEL INVESTIGATION AT HIGH-SUBSONIC SPEEDS OF PLANING-TAIL, BLENDED, AND AIRFOIL-FOREBODY SWEEP HULLS. John M. Riebe and Richard G. MacLeod. September 12, 1949. 33p. diagrs., photos., 3 tabs. (NACA RM L9D01)

HYDRODYNAMIC FORCE CHARACTERISTICS OF A STREAMLINE FUSELAGE MODIFIED BY EITHER BREAKER STRIPS OR ROWS OF AIR JETS SIMULATING CHINES. Bernard Weinflash, Charles L. Shuford, Jr. and Kenneth W. Christopher. February 21, 1950. 45p. diagrs., photos. (NACA RM L9L21a)

INVESTIGATION OF THE HYDRODYNAMIC STABILITY AND RESISTANCE OF TWO STREAMLINE FUSELAGES. Bernard Weinflash and Charles L. Shuford, Jr. April 1952. 32p. diagrs., photos., tab. (NACA RM L52B11)

### LENGTH-BEAM RATIO (2.3.1)

THEORY AND PROCEDURE FOR DETERMINING LOADS AND MOTIONS IN CHINE-IMMERSED HYDRODYNAMIC IMPACTS OF PRISMATIC BODIES. Emanuel Schnitzer. 1953. ii, 29p. diagrs. (NACA Rept. 1152. Formerly TN 2813)

A REVIEW OF PLANING THEORY AND EXPERIMENT WITH A THEORETICAL STUDY OF PURE-PLANING LIFT OF RECTANGULAR FLAT PLATES. Charles L. Shuford, Jr. August 1954. 34p. diagrs. (NACA TN 3233)

### DEAD RISE (2.3.2)

THEORY AND PROCEDURE FOR DETERMINING LOADS AND MOTIONS IN CHINE-IMMERSED HYDRODYNAMIC IMPACTS OF PRISMATIC BODIES. Emanuel Schnitzer. 1953. ii, 29p. diagrs. (NACA Rept. 1152. Formerly TN 2813)

### STEPS (2.3.3)

THE EFFECT OF AIR JETS SIMULATING CHINES OR MULTIPLE STEPS ON THE HYDRODYNAMIC CHARACTERISTICS OF A STREAMLINE FUSELAGE. Bernard Weinflash. January 7, 1949. 37p. diagrs., photos., 2 tabs. (NACA RM L8J21)

THE EFFECT OF AIR-JET AND STRIP MODIFICATIONS ON THE HYDRODYNAMIC CHARACTERISTICS OF THE STREAMLINE FUSELAGE OF A TRANSONIC AIRPLANE. Bernard Weinflash, Kenneth W. Christopher and Charles L. Shuford, Jr. June 3, 1949. 32p. diagrs., photos. (NACA RM L9D20)

### CHINES (2.3.6)

THE EFFECT OF AIR JETS SIMULATING CHINES OR MULTIPLE STEPS ON THE HYDRODYNAMIC CHARACTERISTICS OF A STREAMLINE FUSELAGE. Bernard Weinflash. January 7, 1949. 37p. diagrs., photos., 2 tabs. (NACA RM L8J21)

PRELIMINARY TANK INVESTIGATION OF THE USE OF SINGLE MONOPLANE HYDROFOILS FOR HIGH-SPEED AIRPLANES. Douglas A. King and John A. Rockett. March 22, 1949. 35p. diagrs., photos., 6 tabs. (NACA RM L9A17)

THE EFFECT OF AIR-JET AND STRIP MODIFICATIONS ON THE HYDRODYNAMIC CHARACTERISTICS OF THE STREAMLINE FUSELAGE OF A TRANSONIC AIRPLANE. Bernard Weinflash, Kenneth W. Christopher and Charles L. Shuford, Jr. June 3, 1949. 32p. diagrs., photos. (NACA RM L9D20)

HYDRODYNAMIC FORCE CHARACTERISTICS OF A STREAMLINE FUSELAGE MODIFIED BY EITHER BREAKER STRIPS OR ROWS OF AIR JETS SIMULATING CHINES. Bernard Weinflash, Charles L. Shuford, Jr. and Kenneth W. Christopher. February 21, 1950. 45p. diagrs., photos. (NACA RM L9L21a)



## Planing Surfaces (2.6)

PRELIMINARY TANK TESTS OF NACA HYDRO-SKIS FOR HIGH-SPEED AIRPLANES. John R. Dawson and Kenneth L. Wadlin. November 26, 1947. 19p. diags., photos. (NACA RM L7104)

TANK SPRAY TESTS OF A JET-POWERED MODEL FITTED WITH NACA HYDRO-SKIS. Kenneth L. Wadlin and John A. Ramsen. July 22, 1948. 19p. diags., photos. (NACA RM L8B18)

THE EFFECT OF REAR CHINE STRIPS ON THE TAKE-OFF CHARACTERISTICS OF A HIGH-SPEED AIRPLANE FITTED WITH NACA HYDRO-SKIS. John A. Ramsen. March 17, 1949. 7p. diags., photo. (NACA RM L9B10a)

A REVIEW OF PLANING THEORY AND EXPERIMENT WITH A THEORETICAL STUDY OF PURE-PLANING LIFT OF RECTANGULAR FLAT PLATES. Charles L. Shuford, Jr. August 1954. 34p. diags. (NACA TN 3233)



# Hydrofoils

## (2.7)

PRELIMINARY TANK INVESTIGATION OF THE USE OF SINGLE MONOPLANE HYDROFOILS FOR HIGH-SPEED AIRPLANES. Douglas A. King and John A. Rockett. March 22, 1949. 35p. diagrs., photos., 6 tabs. (NACA RM L9A17)

THE EFFECT OF END PLATES, END STRUTS, AND DEPTH OF SUBMERGENCE ON THE CHARACTERISTICS OF A HYDROFOIL. Kenneth L. Wadlin, Rudolph E. Fontana and Charles L. Shuford, Jr. April 12, 1951. 84p. diagrs., photos. (NACA RM L51B13)

A THEORETICAL AND EXPERIMENTAL INVESTIGATION OF THE LIFT AND DRAG CHARACTERISTICS OF A HYDROFOIL AT SUBCRITICAL AND SUPERCRITICAL SPEEDS. Kenneth L. Wadlin, Charles L. Shuford, Jr. and John R. McGehee. July 1952. 53p. diagrs., photo., tab. (NACA RM L52D23a)

A PRELIMINARY INVESTIGATION OF THE STATIC AND DYNAMIC LONGITUDINAL STABILITY OF A GRUMBERG HYDROFOIL SYSTEM. Norman S. Land, Derrill B. Chambliss and William W. Petynia. September 1952. 48p. diagrs., photos. (NACA RM L52D15)

EFFECTS OF SWEEPBACK AND TAPER ON THE FORCE AND CAVITATION CHARACTERISTICS OF ASPECT-RATIO-4 HYDROFOILS. Douglas A. King and Norman S. Land. December 1952. 61p. diagrs., photos., tab. (NACA RM L52J10)

THEORY AND PROCEDURE FOR DETERMINING LOADS AND MOTIONS IN CHINE-IMMERSED HYDRODYNAMIC IMPACTS OF PRISMATIC BODIES. Emanuel Schnitzer. 1953. ii, 29p. diagrs. (NACA Rept. 1152. Formerly TN 2813)

EXPERIMENTAL INVESTIGATION OF THE FLOW FIELD BEHIND AN ASPECT-RATIO-10 HYDROFOIL NEAR THE WATER SURFACE. Arthur W. Carter and Roger V. Butler. February 1953. 31p. diagrs., photos., tab. (NACA RM L52L11)

THE HYDRODYNAMIC CHARACTERISTICS OF AN ASPECT-RATIO-0.125 MODIFIED RECTANGULAR FLAT PLATE OPERATING NEAR A FREE WATER SURFACE. John A. Ramsen and Victor L. Vaughan, Jr. October 1954. 32p. diagrs. (NACA TN 3249)

HYDRODYNAMIC TARES AND INTERFERENCE EFFECTS FOR A 12-PERCENT-THICK SURFACE-PIERCING STRUT AND AN ASPECT-RATIO-0.25 LIFTING SURFACE. John A. Ramsen and Victor L. Vaughan, Jr. April 1955. 20p. diagrs. (NACA TN 3420)



## **Surface Craft (2.8)**

A PRELIMINARY INVESTIGATION OF THE STATIC  
AND DYNAMIC LONGITUDINAL STABILITY OF A  
GRUMBERG HYDROFOIL SYSTEM. Norman S.  
Land, Derrill B. Chambliss and William W. Petynia.  
September 1952. 48p. diagrs., photos. (NACA  
RM L52D15)



## Stability and Control (2.10)

### LONGITUDINAL

#### (2.10.1)

PRELIMINARY TANK INVESTIGATION OF THE USE OF SINGLE MONOPLANE HYDROFOILS FOR HIGH-SPEED AIRPLANES. Douglas A. King and John A. Rockett. March 22, 1949. 35p. diagrs., photos., 6 tabs. (NACA RM L9A17)

INVESTIGATION OF THE HYDRODYNAMIC STABILITY AND RESISTANCE OF TWO STREAMLINE FUSELAGES. Bernard Weinflash and Charles L. Shuford, Jr. April 1952. 32p. diagrs., photos., tab. (NACA RM L52B11)

A PRELIMINARY INVESTIGATION OF THE STATIC AND DYNAMIC LONGITUDINAL STABILITY OF A GRUMBERG HYDROFOIL SYSTEM. Norman S. Land, Derrill B. Chambliss and William W. Petynia. September 1952. 48p. diagrs., photos. (NACA RM L52D15)



## PROPULSION


(3)



# PROPULSION

## (3)

INVESTIGATION OF JET-ENGINE NOISE REDUC-  
TION BY SCREENS LOCATED TRANSVERSELY  
ACROSS THE JET. Edmund E. Callaghan and  
Willard D. Coles. May 1955. 27p. diags., photos.,  
tab. (NACA TN 3452)



## Complete Systems

### (3.1)

METHOD AND GRAPHS FOR THE EVALUATION OF AIR-INDUCTION SYSTEMS. George B. Brajnikoff. 1953. ii, 22p. diagrs., tab. (NACA Rept. 1141. Formerly TN 2697)

A METHOD FOR EVALUATING THE EFFECTS OF DRAG AND INLET PRESSURE RECOVERY ON PROPULSION-SYSTEM PERFORMANCE. Emil J. Kremzier. August 1954. 21p. diagrs. (NACA TN 3261)

## RECIPROCATING ENGINES

### (3.1.1)

MECHANISM OF START AND DEVELOPMENT OF AIRCRAFT CRASH FIRES. I. Irving Pinkel, G. Merritt Preston and Gerald J. Pesman. 1953. iii, 52p. diagrs., photos., 2 tabs. (NACA Rept. 1133. Formerly RM E52F06)

## TURBOJET ENGINES

### (3.1.3)

EFFECT OF INLET TEMPERATURE AND HUMIDITY ON THRUST AUGMENTATION OF TURBOJET ENGINE BY COMPRESSOR-INLET INJECTION. Thomas B. Shillito and James L. Harp, Jr. July 3, 1950. 46p. diagrs., photos. (NACA RM E50D19)

CARBON DEPOSITION OF SEVERAL SPECIAL TURBOJET-ENGINE FUELS. Jerrold D. Wear and James W. Useller. April 10, 1951. 15p. photos., diagr., tab. (NACA RM E51C02)

EXPERIMENTAL INVESTIGATION OF TYPICAL CONSTANT- AND VARIABLE-AREA EXHAUST NOZZLES AND EFFECTS ON AXIAL-FLOW TURBOJET-ENGINE PERFORMANCE. Lewis E. Wallner and John T. Wintler. July 1951. 43p. diagrs., photos. (NACA RM E51D19)

INVESTIGATION OF MECHANISMS OF BLADE FAILURE OF FORGED HASTELLOY B AND CAST STELLITE 21 TURBINE BLADES IN TURBOJET ENGINE. C. Yaker, C. F. Robards and F. B. Garrett. August 1951. 41p. diagrs., photos., 2 tabs. (NACA RM E51D16)

ALTITUDE-IGNITION LIMIT OF A TURBOJET ENGINE USING A CONDENSER-DISCHARGE IGNITION SYSTEM. John C. Armstrong. October 1951. 5p. diagrs. (NACA RM E51F11)

EXPERIMENTAL INVESTIGATION OF THE VIBRATION CHARACTERISTICS OF FOUR DESIGNS OF TURBINE BLADES AND OF THE EFFECT PRODUCED BY VARYING THE AXIAL SPACING BETWEEN NOZZLE BLADES AND TURBINE BLADES. W. C. Morgan and C. R. Morse. February 1952. 28p. diagrs., photos., tab. (NACA RM E51J25)

INVESTIGATION OF ENGINE PERFORMANCE AND HIGH-TEMPERATURE PROPERTIES OF PRECISION-CAST TURBINE BLADES OF HIGH-CARBON STELLITE 21 AND CONTROLLED-GRAIN-SIZE STELLITE 21. Charles Yaker, Floyd B. Garrett and Paul F. Sikora. June 1952. 38p. diagrs., photos., 6 tabs. (NACA RM E52D10)

INVESTIGATION OF POWER EXTRACTION CHARACTERISTICS AND BRAKING REQUIREMENTS OF A WINDMILLING TURBOJET ENGINE. Curtis L. Walker and David B. Fenn. July 1952. 31p. diagrs., tab. (NACA RM E52D30)

BEHAVIOR OF FORGED S-816 TURBINE BLADES IN STEADY-STATE OPERATION OF J33-9 TURBOJET ENGINE WITH STRESS-RUPTURE AND METALLOGRAPHIC EVALUATIONS. F. B. Garrett, C. A. Gyorgak and J. W. Weeton. February 1953. 29p. diagrs., photos., 3 tabs. (NACA RM E52L17)

COMPARISON OF THEORETICALLY AND EXPERIMENTALLY DETERMINED EFFECTS OF OXIDE COATINGS SUPPLIED BY FUEL ADDITIVES ON UNCOOLED TURBINE-BLADE TEMPERATURE DURING TRANSIENT TURBOJET-ENGINE OPERATION. Louis J. Schafer, Jr., Francis S. Stepka and W. Byron Brown. March 1953. 45p. photos., diagrs., tab. (NACA RM E53A19)

THE DESIGN OF BRITTLE-MATERIAL BLADE ROOTS BASED ON THEORY AND RUPTURE TESTS OF PLASTIC MODELS. Andre J. Meyer, Jr., Albert Kaufman and William C. Caywood. April 6, 1953. 45p. diagrs., photos., tab. (NACA RM E53C12)

THE NEAR NOISE FIELD OF STATIC JETS AND SOME MODEL STUDIES OF DEVICES FOR NOISE REDUCTION. Leslie W. Lassiter and Harvey H. Hubbard. July 1954. 38p. diagrs., photos. (NACA TN 3187)

TRANSVERSE OSCILLATIONS IN A CYLINDRICAL COMBUSTION CHAMBER. Franklin K. Moore and Stephen H. Maslen. October 1954. 25p. diagrs. (NACA TN 3152)

METHODS FOR RAPID GRAPHICAL EVALUATION OF COOLED OR UNCOOLED TURBOJET AND TURBOPROP ENGINE OR COMPONENT PERFORMANCE (EFFECTS OF VARIABLE SPECIFIC HEAT INCLUDED). Jack B. Esgar and Robert R. Ziemer. January 1955. 45p. diagrs. (NACA TN 3335)

INGESTION OF FOREIGN OBJECTS INTO TURBINE ENGINES BY VORTICES. Lewis A. Rodert and Floyd B. Garrett. February 1955. 23p. diagrs., photos. (NACA TN 3330)

A SELF-EXCITED, ALTERNATING-CURRENT, CONSTANT-TEMPERATURE HOT-WIRE ANEMOMETER. Charles E. Shepard. April 1955. 29p. diagrs., photos. (NACA TN 3406)

INVESTIGATION OF JET-ENGINE NOISE REDUCTION BY SCREENS LOCATED TRANSVERSELY ACROSS THE JET. Edmund E. Callaghan and Willard D. Coles. May 1955. 27p. diagrs., photos., tab. (NACA TN 3452)

## TURBO-PROPELLER ENGINES

### (3.1.4)

ANALYSIS OF EXPERIMENTAL SEA-LEVEL TRANSIENT DATA AND ANALOG METHOD OF OBTAINING ALTITUDE RESPONSE FOR TURBINE-PROPELLER ENGINE WITH RELAY-TYPE SPEED CONTROL. George Vasu and George J. Pack. May 17, 1951. 28p. diagrs., photo. (NACA RM E51D26)



## Turbo-Propeller Engines (Cont.)

CORRELATION OF ANALOG SOLUTIONS WITH EXPERIMENTAL SEA-LEVEL TRANSIENT DATA FOR CONTROLLED TURBINE-PROPELLER ENGINE, INCLUDING ANALOG RESULTS AT ALTITUDES. James Lazar and Wilfred L. DeRocher, Jr. August 1951. 36p. diags. (NACA RM E51B08)

INVESTIGATION OF DYNAMIC CHARACTERISTICS OF A TURBINE-PROPELLER ENGINE. Frank L. Oppenheimer and James R. Jacques. September 1951. 22p. diags., tab. (NACA RM E51F15)

A METHOD FOR ESTIMATING SPEED RESPONSE OF GAS-TURBINE ENGINES. Harold Gold and Solomon Rosenzweig. January 1952. 26p. diags. (NACA RM E51K21)

METHODS FOR RAPID GRAPHICAL EVALUATION OF COOLED OR UNCOOLED TURBOJET AND TURBOPROP ENGINE OR COMPONENT PERFORMANCE (EFFECTS OF VARIABLE SPECIFIC HEAT INCLUDED). Jack B. Esgar and Robert R. Ziemer. January 1955. 45p. diags. (NACA TN 3335)

ANALYTICAL DETERMINATION OF EFFECT OF WATER INJECTION ON POWER OUTPUT OF TURBINE-PROPELLER ENGINE. Albert O. Ross and Merle C. Huppert. March 1955. 29p. diags. (NACA TN 3403. Formerly RM E9H17)

## RAM-JET ENGINES

### (3.1.7)

FLIGHT TESTS OF A TWO-DIMENSIONAL WEDGE DIFFUSER AT TRANSONIC AND SUPERSONIC SPEEDS. M. A. Faget. August 11, 1948. 21p. diags., photos. (NACA RM L8E27)

AN ANALYSIS OF BUZZING IN SUPERSONIC RAM JETS BY A MODIFIED ONE-DIMENSIONAL NON-STATIONARY WAVE THEORY. Robert L. Trimpi. March 1952. 72p. diags., photos. (NACA RM L52A18)

A THEORY FOR STABILITY AND BUZZ PULSATION AMPLITUDE IN RAM JETS AND AN EXPERIMENTAL INVESTIGATION INCLUDING SCALE EFFECTS. Robert L. Trimpi. October 1953. 75p. diags., photos., 3 tabs. (NACA RM L53G28)

TRANSVERSE OSCILLATIONS IN A CYLINDRICAL COMBUSTION CHAMBER. Franklin K. Moore and Stephen H. Maslen. October 1954. 25p. diags. (NACA TN 3152)

## ROCKET ENGINES

### (3.1.8)

DETERMINATION OF FLAME TEMPERATURES FROM 2000° TO 3000° K BY MICROWAVE ABSORPTION. Perry W. Kuhns. August 1954. 48p. diags., photo., 2 tabs. (NACA TN 3254)

SOME MEASUREMENTS OF NOISE FROM THREE SOLID-FUEL ROCKET ENGINES. Leslie W. Lassiter and Robert H. Heitkotter. December 1954. 21p. diags. (NACA TN 3316)

IGNITION-DELAY DETERMINATIONS OF FURFURYL ALCOHOL AND MIXED BUTYL MERCAPTANS WITH VARIOUS WHITE FUMING NITRIC ACIDS USING MODIFIED OPEN-CUP AND SMALL-SCALE ROCKET ENGINE APPARATUS. Dezso J. Ladanyi, Riley O. Miller and Glen Hennings. February 1955. 17p. diags., photos., 4 tabs. (NACA RM E53E29)

## JET-DRIVEN ROTORS

### (3.1.9)

DESCRIPTION AND INVESTIGATION OF A DYNAMIC MODEL OF THE XH-17 TWO-BLADE JET-DRIVEN HELICOPTER. George W. Brooks and Maurice A. Sylvester. March 14, 1951. 49p. diags., photos., 6 tabs. (NACA RM L50I21)

THE EFFECT OF CONTROL STIFFNESS AND FORWARD SPEED ON THE FLUTTER OF A 1/10-SCALE DYNAMIC MODEL OF A TWO-BLADE JET-DRIVEN HELICOPTER ROTOR. George W. Brooks and Maurice A. Sylvester. April 1955. 38p. diags., photo., 3 tabs. (NACA TN 3376)

A DYNAMIC-MODEL STUDY OF THE EFFECT OF ADDED WEIGHTS AND OTHER STRUCTURAL VARIATIONS ON THE BLADE BENDING STRAINS OF AN EXPERIMENTAL TWO-BLADE JET-DRIVEN HELICOPTER IN HOVERING AND FORWARD FLIGHT. John Locke McCarty and George W. Brooks. May 1955. i, 47p. diags., photo., 6 tabs. (NACA TN 3367)

## NUCLEAR - ENERGY SYSTEM

### (3.1.10)

SLOWING-DOWN DISTRIBUTION TO INDIUM RESONANCE OF NEUTRONS FROM A Ra- $\alpha$ -Be SOURCE IN WATER-IRON MIXTURES. Daniel Fieno. November 1954. 16p. diags., photo., 2 tabs. (NACA RM E54H04)

REVIEW OF EXPERIMENTAL INVESTIGATIONS OF LIQUID-METAL HEAT TRANSFER. Bernard Lubarsky and Samuel J. Kaufmann. March 1955. 115p. diags., tab. (NACA TN 3336)

## COMPARISON OF ENGINE TYPES

### (3.1.12)

COMPARISON OF HOVERING PERFORMANCE OF HELICOPTERS POWERED BY JET-PROPULSION AND RECIPROCATING ENGINES. Virginia L. Brightwell, Max D. Peters and J. C. Sanders. June 11, 1948. 39p. diags., 3 tabs. (NACA RM E7K21)

METHOD AND GRAPHS FOR THE EVALUATION OF AIR-INDUCTION SYSTEMS. George B. Brajnko. 1953. ii, 22p. diags., tab. (NACA Rept. 1141. Formerly TN 2697)

## Control of Engines

### (3.2)

ANALYSIS OF EXPERIMENTAL SEA-LEVEL TRANSIENT DATA AND ANALOG METHOD OF OBTAINING ALTITUDE RESPONSE FOR TURBINE-PROPELLER ENGINE WITH RELAY-TYPE SPEED CONTROL. George Vasu and George J. Pack. May 17, 1951. 28p. diags., photo. (NACA RM E51D26)

INVESTIGATION OF DYNAMIC CHARACTERISTICS OF A TURBINE-PROPELLER ENGINE. Frank L. Oppenheimer and James R. Jacques. September 1951. 22p. diags., tab. (NACA RM E51F15)

A METHOD FOR ESTIMATING SPEED RESPONSE OF GAS-TURBINE ENGINES. Harold Gold and Solomon Rosenzweig. January 1952. 26p. diags. (NACA RM E51K21)

DESIGN AND PERFORMANCE OF THROTTLE-TYPE FUEL CONTROLS FOR ENGINE DYNAMIC STUDIES. Edward W. Otto, Harold Gold and Kirby W. Hiller. April 1955. 39p. diags., photo. (NACA TN 3445)

### CONTROL OF TURBOJET ENGINES (3.2.2)

COMPARISON OF PERFORMANCE OF AN-F-58 AND AN-F-32 FUELS IN J33-A-23 TURBOJET ENGINE. H. D. Wilsted and J. C. Armstrong. June 2, 1949. 33p. photos., diags., tab. (NACA RM E8K24)

INSTRUMENTATION FOR RECORDING TRANSIENT PERFORMANCE OF GAS-TURBINE ENGINES AND CONTROL SYSTEMS. Gene J. Delio and Glennon V. Schwent. June 27, 1951. 27p. diags., photos. (NACA RM E51D27)

DYNAMIC RESPONSE OF TURBINE-BLADE TEMPERATURE TO EXHAUST-GAS TEMPERATURE FOR GAS-TURBINE ENGINES. Richard Hood and William E. Phillips, Jr. February 1952. 41p. photos., diags. (NACA RM E52A14)

### CONTROL OF TURBINE-RAM-JET ENGINES (3.2.3)

DYNAMIC RESPONSE OF TURBINE-BLADE TEMPERATURE TO EXHAUST-GAS TEMPERATURE FOR GAS-TURBINE ENGINES. Richard Hood and William E. Phillips, Jr. February 1952. 41p. photos., diags. (NACA RM E52A14)

### CONTROL OF TURBINE-PROPELLER ENGINES (3.2.4)

ANALYSIS OF EXPERIMENTAL SEA-LEVEL TRANSIENT DATA AND ANALOG METHOD OF OBTAINING ALTITUDE RESPONSE FOR TURBINE-PROPELLER ENGINE WITH RELAY-TYPE SPEED CONTROL. George Vasu and George J. Pack. May 17, 1951. 28p. diags., photo. (NACA RM E51D26)

CORRELATION OF ANALOG SOLUTIONS WITH EXPERIMENTAL SEA-LEVEL TRANSIENT DATA FOR CONTROLLED TURBINE-PROPELLER ENGINE, INCLUDING ANALOG RESULTS AT ALTITUDES. James Lazar and Wilfred L. DeRocher, Jr. August 1951. 36p. diags. (NACA RM E51B08)

INVESTIGATION OF DYNAMIC CHARACTERISTICS OF A TURBINE-PROPELLER ENGINE. Frank L. Oppenheimer and James R. Jacques. September 1951. 22p. diags., tab. (NACA RM E51F15)

PRELIMINARY INVESTIGATION OF THE CONTROL OF A GAS-TURBINE ENGINE FOR A HELICOPTER. Richard P. Krebs. September 1951. 13p. diags. (NACA RM E51F19)

A METHOD FOR ESTIMATING SPEED RESPONSE OF GAS-TURBINE ENGINES. Harold Gold and Solomon Rosenzweig. January 1952. 26p. diags. (NACA RM E51K21)

DYNAMIC RESPONSE OF TURBINE-BLADE TEMPERATURE TO EXHAUST-GAS TEMPERATURE FOR GAS-TURBINE ENGINES. Richard Hood and William E. Phillips, Jr. February 1952. 41p. photos., diags. (NACA RM E52A14)



## Auxiliary Booster Systems

### (3.3)

#### GAS TURBINES

##### (3.3.2)

##### LIQUID INJECTION

###### (3.3.2.1)

EFFECT OF INLET TEMPERATURE AND HUMIDITY ON THRUST AUGMENTATION OF TURBOJET ENGINE BY COMPRESSOR-INLET INJECTION. Thomas B. Shillito and James L. Harp, Jr. July 3, 1950. 46p. diags., photos. (NACA RM E50D19)

ANALYTICAL DETERMINATION OF EFFECT OF WATER INJECTION ON POWER OUTPUT OF TURBINE-PROPELLER ENGINE. Albert O. Ross and Merle C. Huppert. March 1955. 29p. diags. (NACA TN 3403. Formerly RM E9H17)

##### AFTERBURNING

###### (3.3.2.2)

EFFECT OF FUEL VOLATILITY ON PERFORMANCE OF TAIL-PIPE BURNER. Zelmar Barson and Arthur F. Sargent, Jr. April 30, 1951. 18p. diags., tab. (NACA RM E51C14)

EXPERIMENTAL INVESTIGATION OF TYPICAL CONSTANT- AND VARIABLE-AREA EXHAUST NOZZLES AND EFFECTS ON AXIAL-FLOW TURBOJET-ENGINE PERFORMANCE. Lewis E. Wallner and John T. Wintler. July 1951. 43p. diags., photos. (NACA RM E51D19)

INVESTIGATION OF NOISE FIELD AND VELOCITY PROFILES OF AN AFTERBURNING ENGINE. Warren J. North, Edmund E. Callaghan and Chester D. Lanzo. September 1954. 23p. diags., photos. (NACA RM E54G07)

TRANSVERSE OSCILLATIONS IN A CYLINDRICAL COMBUSTION CHAMBER. Franklin K. Moore and Stephen H. Maslen. October 1954. 25p. diags. (NACA TN 3152)

## Fuels (3.4)

CARBON DEPOSITION OF SEVERAL SPECIAL TURBOJET-ENGINE FUELS. Jerrold D. Wear and James W. Useller. April 10, 1951. 15p. photos., diagr., tab. (NACA RM E51C02)

COMPARISON OF THEORETICALLY AND EXPERIMENTALLY DETERMINED EFFECTS OF OXIDE COATINGS SUPPLIED BY FUEL ADDITIVES ON UNCOOLED TURBINE-BLADE TEMPERATURE DURING TRANSIENT TURBOJET-ENGINE OPERATION. Louis J. Schafer, Jr., Francis S. Stepka and W. Byron Brown. March 1953. 45p. photos., diagrs., tab. (NACA RM E53A19)

BURNING TIMES OF MAGNESIUM RIBBONS IN VARIOUS ATMOSPHERES. Kenneth P. Coffin. December 1954. 37p. diagrs., photos. (NACA TN 3332)

### PHYSICAL AND CHEMICAL PROPERTIES

#### (3.4.2)

ALTITUDE PERFORMANCE OF AN-F-58 FUELS IN J33-A-21 SINGLE COMBUSTOR. Ralph T. Dittrich and Joseph L. Jackson. April 8, 1949. 23p. diagrs., 2 tabs. (NACA RM E8L24)

CARBON DEPOSITION FROM AN-F-58 FUELS IN A J33 SINGLE COMBUSTOR. Jerrold D. Wear and Howard W. Douglass. June 24, 1949. 27p. diagrs., photos., 2 tabs. (NACA RM E9D06)

INVESTIGATION OF IGNITION CHARACTERISTICS OF AN-F-32 AND TWO AN-F-58a FUELS IN SINGLE CAN-TYPE TURBOJET COMBUSTOR. Warren D. Rayle and Howard W. Douglass. October 13, 1950. 25p. photos., diagrs., 2 tabs. (NACA RM E50H16a)

COMBUSTION EFFICIENCY AND ALTITUDE OPERATIONAL LIMITS OF THREE LIQUID HYDRO-CARBON FUELS HAVING HIGH VOLUMETRIC ENERGY CONTENT IN A J33 SINGLE COMBUSTOR. Edward G. Stricker. November 6, 1950. 22p. diagrs., tab. (NACA RM E50H28)

CARBON DEPOSITION OF SEVERAL SPECIAL TURBOJET-ENGINE FUELS. Jerrold D. Wear and James W. Useller. April 10, 1951. 15p. photos., diagr., tab. (NACA RM E51C02)

RELATIONS BETWEEN FUEL PROPERTIES AND COMBUSTION CARBON DEPOSITION. Edmund R. Jonash, Jerrold D. Wear and Robert R. Hibbard. April 1952. 67p. diagrs., 3 tabs. (NACA RM E52B14)

PREDICTION OF FLAME VELOCITIES OF HYDROCARBON FLAMES. Gordon L. Dugger and Dorothy M. Simon. 1954. ii. 10p. diagrs., 4 tabs. (NACA Rept. 1158. Formerly RM E52J13)

FORMATION AND COMBUSTION OF SMOKE IN LAMINAR FLAMES. Rose L. Schalla, Thomas P. Clark and Glen E. McDonald. 1954. ii. 21p. diagrs., photos. (NACA Rept. 1186. Formerly RM E51E15; RM E52G24; RM E52I22; RM E52I26; RM E53E05; RM E53J12; RM E54E03)

INFRARED SPECTRA OF 47 DICYCLIC HYDRO-CARBONS. John H. Lamneck, Jr., Harold F. Hipsher and Virginia O. Fenn. June 1954. 34p. diagrs., 5 tabs. (NACA TN 3154)

IGNITION-DELAY DETERMINATIONS OF FURFURYL ALCOHOL AND MIXED BUTYL MERCAPTANS WITH VARIOUS WHITE FUMING NITRIC ACIDS USING MODIFIED OPEN-CUP AND SMALL-SCALE ROCKET ENGINE APPARATUS. Dezso J. Ladanyi, Riley O. Miller and Glen Hennings. February 1955. 17p. diagrs., photos., 4 tabs. (NACA RM E53E29)

AN EVALUATION OF NON-NEWTONIAN FLOW IN PIPE LINES. Ruth N. Weltmann. February 1955. 40p. diagrs., tab. (NACA TN 3397)

A THERMAL EQUATION FOR FLAME QUENCHING. A. E. Potter, Jr. and A. L. Berlad. February 1955. 18p. diagrs., tab. (NACA TN 3398)

TEMPERATURE-COMPOSITION LIMITS OF SPONTANEOUS EXPLOSION FOR NINE ALKYL-SILANES WITH AIR AT ATMOSPHERIC PRESSURE. Rose L. Schalla and Glen E. McDonald. February 1955. 13p. diagrs. (NACA TN 3405)

CHAIN BREAKING AND BRANCHING IN THE ACTIVE-PARTICLE DIFFUSION CONCEPT OF QUENCHING. Frank E. Belles and A. L. Berlad. February 1955. 37p. diagrs., 3 tabs. (NACA TN 3409)

EFFECT OF AMMONIA ADDITION ON LIMITS OF FLAME PROPAGATION FOR ISOOCTANE-AIR MIXTURES AT REDUCED PRESSURES AND ELEVATED TEMPERATURES. Cleveland O'Neal, Jr. April 1955. 32p. diagrs., 3 tabs. (NACA TN 3446)

### RELATION TO ENGINE PERFORMANCE (3.4.3)

ALTITUDE PERFORMANCE OF AN-F-58 FUELS IN J33-A-21 SINGLE COMBUSTOR. Ralph T. Dittrich and Joseph L. Jackson. April 8, 1949. 23p. diagrs., 2 tabs. (NACA RM E8L24)

RELATIONS BETWEEN FUEL PROPERTIES AND COMBUSTION CARBON DEPOSITION. Edmund R. Jonash, Jerrold D. Wear and Robert R. Hibbard. April 1952. 67p. diagrs., 3 tabs. (NACA RM E52B14)

### TURBINE ENGINES, RAM JETS, AND PULSE JETS (3.4.3.2)

COMPARISON OF PERFORMANCE OF AN-F-58 AND AN-F-32 FUELS IN J33-A-23 TURBOJET ENGINE. H. D. Wilsted and J. C. Armstrong. June 2, 1949. 33p. photos., diagrs., tab. (NACA RM E8K24)



Turbine Engines, Ram Jets,  
and Pulse Jets (Cont.)

CARBON DEPOSITION FROM AN-F-58 FUELS IN A J33 SINGLE COMBUSTOR. Jerrold D. Wear and Howard W. Douglass. June 24, 1949. 27p. diags., photos., 2 tabs. (NACA RM E9D06)

INVESTIGATION OF IGNITION CHARACTERISTICS OF AN-F-32 AND TWO AN-F-58a FUELS IN SINGLE CAN-TYPE TURBOJET COMBUSTOR. Warren D. Rayle and Howard W. Douglass. October 13, 1950. 25p. photos., diags., 2 tabs. (NACA RM E50H16a)

COMBUSTION EFFICIENCY AND ALTITUDE OPERATIONAL LIMITS OF THREE LIQUID HYDRO-CARBON FUELS HAVING HIGH VOLUMETRIC ENERGY CONTENT IN A J33 SINGLE COMBUSTOR. Edward G. Stricker. November 6, 1950. 22p. diags., tab. (NACA RM E50H28)

COMBUSTION PROPERTIES OF ALUMINUM AS RAM-JET FUEL. J. Robert Branstetter, Albert M. Lord and Melvin Gerstein. March 28, 1951. 37p. diags., photos. (NACA RM E51B02)

CARBON DEPOSITION OF SEVERAL SPECIAL TURBOJET-ENGINE FUELS. Jerrold D. Wear and James W. Useller. April 10, 1951. 15p. photos., diagr., tab. (NACA RM E51C02)

EFFECT OF FUEL VOLATILITY ON PERFORMANCE OF TAIL-PIPE BURNER. Zelmar Barson and Arthur F. Sargent, Jr. April 30, 1951. 18p. diags., tab. (NACA RM E51C14)

RELATIONS BETWEEN FUEL PROPERTIES AND COMBUSTION CARBON DEPOSITION. Edmund R. Jonash, Jerrold D. Wear and Robert R. Hibbard. April 1952. 67p. diags., 3 tabs. (NACA RM E52B14)

BURNING RATES OF SINGLE FUEL DROPS AND THEIR APPLICATION TO TURBOJET COMBUSTION PROCESS. Charles C. Graves. July 1953. 35p. diags., photos., tab. (NACA RM E53E22)

ROCKETS (INCLUDES FUEL  
AND OXIDANT)  
(3.4.3.3)

PHOTOGRAPHIC INVESTIGATION OF COMBUSTION IN A TWO-DIMENSIONAL TRANSPARENT ROCKET ENGINE. Donald R. Bellman, Jack C. Humphrey and Theodore Male. 1953. ii, 12p. diags., photos., tab. (NACA Rept. 1134. Formerly RM E8F01)

CORROSION OF METALS OF CONSTRUCTION BY ALTERNATE EXPOSURE TO LIQUID AND GASEOUS FLUORINE. Richard M. Gundzik and Charles E. Feiler. December 1954. 10p. photos., 3 tabs. (NACA TN 3333)

IGNITION-DELAY DETERMINATIONS OF FURFURYL ALCOHOL AND MIXED BUTYL MERCAPTANS WITH VARIOUS WHITE FUMING NITRIC ACIDS USING MODIFIED OPEN-CUP AND SMALL-SCALE ROCKET ENGINE APPARATUS. Dezso J. Ladanyi, Riley O. Miller and Glen Hennings. February 1955. 17p. diags., photos., 4 tabs. (NACA RM E53E29)

## Combustion and Combustors (3.5)

COMPARISON OF THEORETICALLY AND EXPERIMENTALLY DETERMINED EFFECTS OF OXIDE COATINGS SUPPLIED BY FUEL ADDITIVES ON UNCOOLED TURBINE-BLADE TEMPERATURE DURING TRANSIENT TURBOJET-ENGINE OPERATION. Louis J. Schafer, Jr., Francis S. Stepka and W. Byron Brown. March 1953. 45p. photos., diagrs., tab. (NACA RM E53A19)

### GENERAL COMBUSTION RESEARCH

#### (3.5.1)

BURNING RATES OF SINGLE FUEL DROPS AND THEIR APPLICATION TO TURBOJET COMBUSTION PROCESS. Charles C. Graves. July 1953. 35p. diagrs., photos., tab. (NACA RM E53E22)

PREDICTION OF FLAME VELOCITIES OF HYDROCARBON FLAMES. Gordon L. Dugger and Dorothy M. Simon. 1954. ii. 10p. diagrs., 4 tabs. (NACA Rept. 1158. Formerly RM E52J13)

FORMATION AND COMBUSTION OF SMOKE IN LAMINAR FLAMES. Rose L. Schalla, Thomas P. Clark and Glen E. McDonald. 1954. ii, 21p. diagrs., photos. (NACA Rept. 1186. Formerly RM E51E15; RM E52G24; RM E52I22; RM E52I26; RM E53E05; RM E53J12; RM E54E03)

BURNING TIMES OF MAGNESIUM RIBBONS IN VARIOUS ATMOSPHERES. Kenneth P. Coffin. December 1954. 37p. diagrs., photos. (NACA TN 3332)

A THERMAL EQUATION FOR FLAME QUENCHING. A. E. Potter, Jr. and A. L. Berlad. February 1955. 18p. diagrs., tab. (NACA TN 3398)

TEMPERATURE-COMPOSITION LIMITS OF SPONTANEOUS EXPLOSION FOR NINE ALKYL-SILANES WITH AIR AT ATMOSPHERIC PRESSURE. Rose L. Schalla and Glen E. McDonald. February 1955. 13p. diagrs. (NACA TN 3405)

### LAMINAR-FLOW COMBUSTION (3.5.1.1)

PREDICTION OF FLAME VELOCITIES OF HYDROCARBON FLAMES. Gordon L. Dugger and Dorothy M. Simon. 1954. ii. 10p. diagrs., 4 tabs. (NACA Rept. 1158. Formerly RM E52J13)

FORMATION AND COMBUSTION OF SMOKE IN LAMINAR FLAMES. Rose L. Schalla, Thomas P. Clark and Glen E. McDonald. 1954. ii, 21p. diagrs., photos. (NACA Rept. 1186. Formerly RM E51E15; RM E52G24; RM E52I22; RM E52I26; RM E53E05; RM E53J12; RM E54E03)

A STUDY OF THE RADIATION FROM LAMINAR AND TURBULENT OPEN PROPANE-AIR FLAMES AS A FUNCTION OF FLAME AREA, EQUIVALENCE RATIO, AND FUEL FLOW RATE. Thomas P. Clark and David A. Bittker. August 1954. 33p. diagrs., photos., 2 tabs. (NACA RM E54F29)

BURNING TIMES OF MAGNESIUM RIBBONS IN VARIOUS ATMOSPHERES. Kenneth P. Coffin. December 1954. 37p. diagrs., photos. (NACA TN 3332)

CHAIN BREAKING AND BRANCHING IN THE ACTIVE-PARTICLE DIFFUSION CONCEPT OF QUENCHING. Frank E. Belles and A. L. Berlad. February 1955. 37p. diagrs., 3 tabs. (NACA TN 3409)

### TURBULENT-FLOW COMBUSTION (3.5.1.2)

A PRELIMINARY INVESTIGATION OF COMBUSTION WITH ROTATING FLOW IN AN ANNULAR COMBUSTION CHAMBER. Ira R. Schwartz. September 1951. 18p. diagrs., photos. (NACA RM L51E25a)

A STUDY OF THE RADIATION FROM LAMINAR AND TURBULENT OPEN PROPANE-AIR FLAMES AS A FUNCTION OF FLAME AREA, EQUIVALENCE RATIO, AND FUEL FLOW RATE. Thomas P. Clark and David A. Bittker. August 1954. 33p. diagrs., photos., 2 tabs. (NACA RM E54F29)

INTERACTION OF A FREE FLAME FRONT WITH A TURBULENCE FIELD. Maurice Tucker. March 1955. 55p. diagrs., 2 tabs. (NACA TN 3407)

### EFFECTS OF FUEL ATOMIZATION (3.5.1.4)

PHOTOGRAPHIC INVESTIGATION OF COMBUSTION IN A TWO-DIMENSIONAL TRANSPARENT ROCKET ENGINE. Donald R. Bellman, Jack C. Humphrey and Theodore Male. 1953. ii, 12p. diagrs., photos., tab. (NACA Rept. 1134. Formerly RM E8F01)

### REACTION MECHANISMS (3.5.1.5)

BURNING RATES OF SINGLE FUEL DROPS AND THEIR APPLICATION TO TURBOJET COMBUSTION PROCESS. Charles C. Graves. July 1953. 35p. diagrs., photos., tab. (NACA RM E53E22)

FORMATION AND COMBUSTION OF SMOKE IN LAMINAR FLAMES. Rose L. Schalla, Thomas P. Clark and Glen E. McDonald. 1954. ii, 21p. diagrs., photos. (NACA Rept. 1186. Formerly RM E51E15; RM E52G24; RM E52I22; RM E52I26; RM E53E05; RM E53J12; RM E54E03)

A THERMAL EQUATION FOR FLAME QUENCHING. A. E. Potter, Jr. and A. L. Berlad. February 1955. 18p. diagrs., tab. (NACA TN 3398)

CHAIN BREAKING AND BRANCHING IN THE ACTIVE-PARTICLE DIFFUSION CONCEPT OF QUENCHING. Frank E. Belles and A. L. Berlad. February 1955. 37p. diagrs., 3 tabs. (NACA TN 3409)



IGNITION OF GASES  
(3.5.1.6)

SPARK IGNITION OF FLOWING GASES. IV - THEORY OF IGNITION IN NONTURBULENT AND TURBULENT FLOW USING LONG-DURATION DISCHARGES. Clyde C. Swett, Jr. August 1954. 29p. diags., 2 tabs. (NACA RM E54F29a)

EFFECT OF AMMONIA ADDITION ON LIMITS OF FLAME PROPAGATION FOR ISOCTANE-AIR MIXTURES AT REDUCED PRESSURES AND ELEVATED TEMPERATURES. Cleveland O'Neal, Jr. April 1955. 32p. diags., 3 tabs. (NACA TN 3446)

EFFECT OF ENGINE  
OPERATING CONDITIONS  
& COMBUSTION CHAMBER  
GEOMETRY  
(3.5.2)

ALTITUDE PERFORMANCE OF AN-F-58 FUELS IN J33-A-21 SINGLE COMBUSTOR. Ralph T. Dittrich and Joseph L. Jackson. April 8, 1949. 23p. diags., 2 tabs. (NACA RM E8L24)

BURNING RATES OF SINGLE FUEL DROPS AND THEIR APPLICATION TO TURBOJET COMBUSTION PROCESS. Charles C. Graves. July 1953. 35p. diags., photos., tab. (NACA RM E53E22)

TRANSVERSE OSCILLATIONS IN A CYLINDRICAL COMBUSTION CHAMBER. Franklin K. Moore and Stephen H. Maslen. October 1954. 25p. diags. (NACA TN 3152)

TURBINE ENGINES  
(3.5.2.2)

ALTITUDE PERFORMANCE OF AN-F-58 FUELS IN J33-A-21 SINGLE COMBUSTOR. Ralph T. Dittrich and Joseph L. Jackson. April 8, 1949. 23p. diags., 2 tabs. (NACA RM E8L24)

CARBON DEPOSITION FROM AN-F-58 FUELS IN A J33 SINGLE COMBUSTOR. Jerrold D. Wear and Howard W. Douglass. June 24, 1949. 27p. diags., photos., 2 tabs. (NACA RM E9D06)

INVESTIGATION OF IGNITION CHARACTERISTICS OF AN-F-32 AND TWO AN-F-58a FUELS IN SINGLE CAN-TYPE TURBOJET COMBUSTOR. Warren D. Rayle and Howard W. Douglass. October 13, 1950. 25p. photos., diags., 2 tabs. (NACA RM E50H16a)

COMBUSTION EFFICIENCY AND ALTITUDE OPERATIONAL LIMITS OF THREE LIQUID HYDRO-CARBON FUELS HAVING HIGH VOLUMETRIC ENERGY CONTENT IN A J33 SINGLE COMBUSTOR. Edward G. Stricker. November 6, 1950. 22p. diags., tab. (NACA RM E50H28)

A PRELIMINARY INVESTIGATION OF COMBUSTION WITH ROTATING FLOW IN AN ANNULAR COMBUSTION CHAMBER. Ira R. Schwartz. September 1951. 18p. diags., photos. (NACA RM L51E25a)

RAM-JET ENGINES  
(3.5.2.3)

COMBUSTION PROPERTIES OF ALUMINUM AS RAM-JET FUEL. J. Robert Branstetter, Albert M. Lord and Melvin Gerstein. March 28, 1951. 37p. diags., photos. (NACA RM E51B02)

A PRELIMINARY INVESTIGATION OF COMBUSTION WITH ROTATING FLOW IN AN ANNULAR COMBUSTION CHAMBER. Ira R. Schwartz. September 1951. 18p. diags., photos. (NACA RM L51E25a)

ROCKET ENGINES  
(3.5.2.5)

PHOTOGRAPHIC INVESTIGATION OF COMBUSTION IN A TWO-DIMENSIONAL TRANSPARENT ROCKET ENGINE. Donald R. Bellman, Jack C. Humphrey and Theodore Male. 1953. ii, 12p. diags., photos., tab. (NACA Rept. 1134. Formerly RM E8F01)

IGNITION-DELAY DETERMINATIONS OF FURFURYL ALCOHOL AND MIXED BUTYL MERCAPTANS WITH VARIOUS WHITE FUMING NITRIC ACIDS USING MODIFIED OPEN-CUP AND SMALL-SCALE ROCKET ENGINE APPARATUS. Dezso J. Ladanyi, Riley O. Miller and Glen Hennings. February 1955. 17p. diags., photos., 4 tabs. (NACA RM E53E29)

## Compression and Compressors

### (3.6)

EFFECT OF INLET TEMPERATURE AND HUMIDITY ON THRUST AUGMENTATION OF TURBOJET ENGINE BY COMPRESSOR-INLET INJECTION. Thomas B. Shillito and James L. Harp, Jr. July 3, 1950. 46p. diags., photos. (NACA RM E50D19)

A SELF-EXCITED, ALTERNATING-CURRENT, CONSTANT-TEMPERATURE HOT-WIRE ANEMOMETER. Charles E. Shepard. April 1955. 29p. diags., photos. (NACA TN 3406)

### FLOW THEORY AND EXPERIMENT

#### (3.6.1)

PREDICTION OF LOSSES INDUCED BY ANGLES OF ATTACK IN CASCADES OF SHARP-NOSED BLADES FOR INCOMPRESSIBLE AND SUBSONIC COMPRESSIBLE FLOW. James J. Kramer and John D. Stanitz. January 1955. 45p. diags. (NACA TN 3149)

#### AXIAL FLOW

##### (3.6.1.1)

APPROXIMATE EFFECT OF LEADING-EDGE THICKNESS, INCIDENCE ANGLE, AND INLET MACH NUMBER ON INLET LOSSES FOR HIGH-SOLIDITY CASCADES OF LOW CAMBERED BLADES. Linwood C. Wright. December 1954. 38p. diags. (NACA TN 3327)

SHOCKS IN HELICAL FLOWS THROUGH ANNULAR CASCADES OF STATOR BLADES. Robert Wasserman and Arthur W. Goldstein. December 1954. 27p. diags. (NACA TN 3329)

#### RADIAL FLOW

##### (3.6.1.2)

A NOTE ON SECONDARY FLOW IN ROTATING RADIAL CHANNELS. James J. Kramer and John D. Stanitz. 1954. ii, 12p. diags. (NACA Rept. 1179. Formerly TN 3013)

A RAPID APPROXIMATE METHOD FOR THE DESIGN OF HUB SHROUD PROFILES OF CENTRIFUGAL IMPELLERS OF GIVEN BLADE SHAPE. Kenneth J. Smith and Joseph T. Hamrick. March 1955. 26p. diags., 3 tabs. (NACA TN 3399)

#### MIXED FLOW

##### (3.6.1.3)

DESIGN AND PERFORMANCE OF EXPERIMENTAL AXIAL-DISCHARGE MIXED-FLOW COMPRESSOR. II - PERFORMANCE OF IMPELLER. Ward W. Wilcox. August 12, 1948. 21p. diags., photo. (NACA RM E8F07)

A RAPID APPROXIMATE METHOD FOR THE DESIGN OF HUB SHROUD PROFILES OF CENTRIFUGAL IMPELLERS OF GIVEN BLADE SHAPE. Kenneth J. Smith and Joseph T. Hamrick. March 1955. 26p. diags., 3 tabs. (NACA TN 3399)

### STRESS AND VIBRATION

#### (3.6.2)

LIFT AND MOMENT EQUATIONS FOR OSCILLATING AIRFOILS IN AN INFINITE UNSTAGGERED CASCADE. Alexander Mendelson and Robert W. Carroll. October 1954. 46p. diags., 3 tabs. (NACA TN 3263)

A SELF-EXCITED, ALTERNATING-CURRENT, CONSTANT-TEMPERATURE HOT-WIRE ANEMOMETER. Charles E. Shepard. April 1955. 29p. diags., photos. (NACA TN 3406)

### MATCHING

#### (3.6.3)

METHODS FOR RAPID GRAPHICAL EVALUATION OF COOLED OR UNCOOLED TURBOJET AND TURBOPROP ENGINE OR COMPONENT PERFORMANCE (EFFECTS OF VARIABLE SPECIFIC HEAT INCLUDED). Jack B. Esgar and Robert R. Ziemer. January 1955. 45p. diags. (NACA TN 3335)



# Turbines

## (3.7)

EXPERIMENTAL INVESTIGATION OF THE VIBRATION CHARACTERISTICS OF FOUR DESIGNS OF TURBINE BLADES AND OF THE EFFECT PRODUCED BY VARYING THE AXIAL SPACING BETWEEN NOZZLE BLADES AND TURBINE BLADES. W. C. Morgan and C. R. Morse. February 1952. 28p. diags., photos., tab. (NACA RM E51J25)

PRELIMINARY INVESTIGATION OF THE HEAT-SHOCK RESISTANT PROPERTIES OF MOLYBDENUM DISILICIDE BLADES UNDER CENTRIFUGAL LOAD. Roger A. Long and John C. Freche. May 1952. 15p. diags., photos., tab. (NACA RM E52A17)

COMPARISON OF THEORETICALLY AND EXPERIMENTALLY DETERMINED EFFECTS OF OXIDE COATINGS SUPPLIED BY FUEL ADDITIVES ON UNCOOLED TURBINE-BLADE TEMPERATURE DURING TRANSIENT TURBOJET-ENGINE OPERATION. Louis J. Schafer, Jr., Francis S. Stepka and W. Byron Brown. March 1953. 45p. photos., diags., tab. (NACA RM E53A19)

## FLOW THEORY AND

### EXPERIMENT

#### (3.7.1)

PREDICTION OF LOSSES INDUCED BY ANGLES OF ATTACK IN CASCADES OF SHARP-NOSED BLADES FOR INCOMPRESSIBLE AND SUBSONIC COMPRESSIBLE FLOW. James J. Kramer and John D. Stanitz. January 1955. 45p. diags. (NACA TN 3149)

### AXIAL FLOW

#### (3.7.1.1)

STUDY OF STRESS STATES IN GAS-TURBINE DISK AS DETERMINED FROM MEASURED OPERATING-TEMPERATURE DISTRIBUTIONS. J. Elmo Farmer, M. B. Millenson and S. S. Manson. July 21, 1948. 41p. diags., photos. (NACA RM E8C16)

EXPERIMENTAL INVESTIGATION OF THE VIBRATION CHARACTERISTICS OF FOUR DESIGNS OF TURBINE BLADES AND OF THE EFFECT PRODUCED BY VARYING THE AXIAL SPACING BETWEEN NOZZLE BLADES AND TURBINE BLADES. W. C. Morgan and C. R. Morse. February 1952. 28p. diags., photos., tab. (NACA RM E51J25)

SECONDARY FLOWS AND BOUNDARY-LAYER ACCUMULATIONS IN TURBINE NOZZLES. Harold E. Rohlik, Milton G. Kofskey, Hubert W. Allen and Howard Z. Herzig. 1954. ii, 32p. diags., photos., 3 tabs. (NACA Rept. 1168. Formerly TN 2871; TN 2909; TN 2989)

SMOKE STUDY OF NOZZLE SECONDARY FLOWS IN A LOW-SPEED TURBINE. Milton G. Kofskey and Hubert W. Allen. November 1954. 24p. diags., photos. (NACA TN 3260)

APPROXIMATE EFFECT OF LEADING-EDGE THICKNESS, INCIDENCE ANGLE, AND INLET MACH NUMBER ON INLET LOSSES FOR HIGH-SOLIDITY CASCADES OF LOW CAMBERED BLADES. Linwood C. Wright. December 1954. 38p. diags. (NACA TN 3327)

### RADIAL FLOW

#### (3.7.1.2)

A NOTE ON SECONDARY FLOW IN ROTATING RADIAL CHANNELS. James J. Kramer and John D. Stanitz. 1954. ii, 12p. diags. (NACA Rept. 1179. Formerly TN 3013)

## COOLING

### (3.7.2)

STUDY OF STRESS STATES IN GAS-TURBINE DISK AS DETERMINED FROM MEASURED OPERATING-TEMPERATURE DISTRIBUTIONS. J. Elmo Farmer, M. B. Millenson and S. S. Manson. July 21, 1948. 41p. diags., photos. (NACA RM E8C16)

EXPERIMENTAL INVESTIGATION OF AIR-FLOW UNIFORMITY AND PRESSURE LEVEL ON WIRE CLOTH FOR TRANSPIRATION-COOLING APPLICATIONS. Patrick L. Donoughe and Roy A. McKinnon. July 1952. 28p. diags., photos., tab. (NACA RM E52E16)

COMPARISON OF THEORETICALLY AND EXPERIMENTALLY DETERMINED EFFECTS OF OXIDE COATINGS SUPPLIED BY FUEL ADDITIVES ON UNCOOLED TURBINE-BLADE TEMPERATURE DURING TRANSIENT TURBOJET-ENGINE OPERATION. Louis J. Schafer, Jr., Francis S. Stepka and W. Byron Brown. March 1953. 45p. photos., diags., tab. (NACA RM E53A19)

COMPARISON OF EFFECTIVENESS OF CONVECTION-, TRANSPIRATION-, AND FILM-COOLING METHODS WITH AIR AS COOLANT. E. R. G. Eckert and John N. B. Livingood. 1954. ii, 17p. diags. (NACA Rept. 1182. Formerly TN 3010)

METHOD FOR RAPID DETERMINATION OF PRESSURE CHANGE FOR ONE-DIMENSIONAL FLOW WITH HEAT TRANSFER, FRICTION, ROTATION, AND AREA CHANGE. James E. Hubbart, Henry O. Slone and Vernon L. Arne. June 1954. 22p. diags., 2 tabs. (NACA TN 3150)

HEAT, MASS, AND MOMENTUM TRANSFER FOR FLOW OVER A FLAT PLATE WITH BLOWING OR SUCTION. H. S. Mickley, R. C. Ross, A. L. Squyers and W. E. Stewart. Massachusetts Institute of Technology. July 1954. ii, 149p. diags., photos., 9 tabs. (NACA TN 3208)

EXACT SOLUTIONS OF LAMINAR-BOUNDARY-LAYER EQUATIONS WITH CONSTANT PROPERTY VALUES FOR POROUS WALL WITH VARIABLE TEMPERATURE. Patrick L. Donoughe and John N. B. Livingood. September 1954. 42p. diags., 2 tabs. (NACA TN 3151)

## PROPULSION

### 130 TURBINES (3.7)

#### Cooling (Cont.)

METHODS FOR RAPID GRAPHICAL EVALUATION OF COOLED OR UNCOOLED TURBOJET AND TURBOPROP ENGINE OR COMPONENT PERFORMANCE (EFFECTS OF VARIABLE SPECIFIC HEAT INCLUDED). Jack B. Esgar and Robert R. Ziemer. January 1955. 45p. diagrs. (NACA TN 3335)

EXPERIMENTS ON TURBULENT FLOW THROUGH CHANNELS HAVING POROUS ROUGH SURFACES WITH OR WITHOUT AIR INJECTION. E. R. G. Eckert, Anthony J. Diaguila and Patrick L. Donoughe. February 1955. 45p. diagrs., photos., tab. (NACA TN 3339)

ONE-DIMENSIONAL CALCULATION OF FLOW IN A ROTATING PASSAGE WITH EJECTION THROUGH A POROUS WALL. E. R. G. Eckert, John N. B. Livingood and Ernst I. Prasse. March 1955. 29p. diagrs., photo. (NACA TN 3408)

## STRESS AND VIBRATION

### (3.7.3)

STUDY OF STRESS STATES IN GAS-TURBINE DISK AS DETERMINED FROM MEASURED OPERATING-TEMPERATURE DISTRIBUTIONS. J. Elmo Farmer, M. B. Millenson and S. S. Manson. July 21, 1948. 41p. diagrs., photos. (NACA RM E8C16)

INVESTIGATION OF MECHANISMS OF BLADE FAILURE OF FORGED HASTELLOY B AND CAST STELLITE 21 TURBINE BLADES IN TURBOJET ENGINE. C. Yaker, C. F. Robards and F. B. Garrett. August 1951. 41p. diagrs., photos., 2 tabs. (NACA RM E51D16)

EXPERIMENTAL INVESTIGATION OF THE VIBRATION CHARACTERISTICS OF FOUR DESIGNS OF TURBINE BLADES AND OF THE EFFECT PRODUCED BY VARYING THE AXIAL SPACING BETWEEN NOZZLE BLADES AND TURBINE BLADES. W. C. Morgan and C. R. Morse. February 1952. 28p. diagrs., photos., tab. (NACA RM E51J25)

BEHAVIOR OF FORGED S-816 TURBINE BLADES IN STEADY-STATE OPERATION OF J33-9 TURBOJET ENGINE WITH STRESS-RUPTURE AND METALLOGRAPHIC EVALUATIONS. F. B. Garrett, C. A. Gyorgak and J. W. Weeton. February 1953. 29p. diagrs., photos., 3 tabs. (NACA RM E52L17)

THE DESIGN OF BRITTLE-MATERIAL BLADE ROOTS BASED ON THEORY AND RUPTURE TESTS OF PLASTIC MODELS. Andre J. Meyer, Jr., Albert Kaufman and William C. Caywood. April 6, 1953. 45p. diagrs., photos., tab. (NACA RM E53C12)

## MATCHING

### (3.7.4)

METHODS FOR RAPID GRAPHICAL EVALUATION OF COOLED OR UNCOOLED TURBOJET AND TURBOPROP ENGINE OR COMPONENT PERFORMANCE (EFFECTS OF VARIABLE SPECIFIC HEAT INCLUDED). Jack B. Esgar and Robert R. Ziemer. January 1955. 45p. diagrs. (NACA TN 3335)



## Friction and Lubrication (3.8)

**SURVEY OF LESS-INFLAMMABLE HYDRAULIC FLUIDS FOR AIRCRAFT.** Wray V. Drake and I. L. Drell. September 7, 1950. 64p. 14 tabs. (NACA RM E50F29)

### THEORY AND EXPERIMENT (3.8.1)

**ANALYTICAL DERIVATION AND EXPERIMENTAL EVALUATION OF SHORT-BEARING APPROXIMATION FOR FULL JOURNAL BEARINGS.** George B. DuBois and Fred W. Ocvirk, Cornell Univ. 1953. ii, 32p. diagrs., photos., 4 tabs. (NACA Rept. 1157. Formerly TN 2808; TN 2809)

**COMPARISON OF PERFORMANCE OF EXPERIMENTAL AND CONVENTIONAL CAGE DESIGNS AND MATERIALS FOR 75-MILLIMETER-BORE CYLINDRICAL ROLLER BEARINGS AT HIGH SPEEDS.** William J. Anderson, E. Fred Macks and Zolton N. Nemeth. 1954. 11, 15p. diagrs., 6 tabs. (NACA Rept. 1177. Formerly TN 3001; TN 3002)

**EFFECTS OF CHEMICALLY ACTIVE ADDITIVES ON BOUNDARY LUBRICATION OF STEEL BY SILICONES.** S. F. Murray and Robert L. Johnson. August 1954. 24p. diagrs., photos., tab. (NACA TN 3257)

**FRICTION OF POSSIBLE SOLID LUBRICANTS WITH VARIOUS CRYSTAL STRUCTURES.** Marshall B. Peterson and Robert L. Johnson. December 1954. 32p. diagrs., photos., 2 tabs. (NACA TN 3334)

**BOUNDARY LUBRICATION OF STEEL WITH FLUORINE- AND CHLORINE-SUBSTITUTED METHANE AND ETHANE GASES.** S. F. Murray, Robert L. Johnson and Max A. Swikert. February 1955. 17p. photos., diagrs., 2 tabs. (NACA TN 3402)

### HYDRODYNAMIC THEORY (3.8.1.1)

**INVESTIGATION OF TEMPERATURE LIMITATION OF VARIOUS LUBRICANTS FOR HIGH-TEMPERATURE 20-MILLIMETER-BORE BALL BEARINGS.** Z. N. Nemeth and W. J. Anderson. January 1955. 31p. diagrs., photos., 2 tabs. (NACA TN 3337)

### CHEMISTRY OF LUBRICATION (3.8.1.2)

**EFFECTS OF CHEMICALLY ACTIVE ADDITIVES ON BOUNDARY LUBRICATION OF STEEL BY SILICONES.** S. F. Murray and Robert L. Johnson. August 1954. 24p. diagrs., photos., tab. (NACA TN 3257)

**FRICTION OF POSSIBLE SOLID LUBRICANTS WITH VARIOUS CRYSTAL STRUCTURES.** Marshall B. Peterson and Robert L. Johnson. December 1954. 32p. diagrs., photos., 2 tabs. (NACA TN 3334)

**INVESTIGATION OF TEMPERATURE LIMITATION OF VARIOUS LUBRICANTS FOR HIGH-TEMPERATURE 20-MILLIMETER-BORE BALL BEARINGS.** Z. N. Nemeth and W. J. Anderson. January 1955. 31p. diagrs., photos., 2 tabs. (NACA TN 3337)

**BOUNDARY LUBRICATION OF STEEL WITH FLUORINE- AND CHLORINE-SUBSTITUTED METHANE AND ETHANE GASES.** S. F. Murray, Robert L. Johnson and Max A. Swikert. February 1955. 17p. photos., diagrs., 2 tabs. (NACA TN 3402)

**FRICTION, WEAR, AND SURFACE DAMAGE OF METALS AS AFFECTED BY SOLID SURFACE FILMS.** Edmond E. Bisson, Robert L. Johnson, Max A. Swikert and Douglas Godfrey. May 1955. 60p. diagrs., photos., tab. (NACA TN 3444)

### SURFACE CONDITIONS (3.8.1.3)

**FRICTION, WEAR, AND SURFACE DAMAGE OF METALS AS AFFECTED BY SOLID SURFACE FILMS.** Edmond E. Bisson, Robert L. Johnson, Max A. Swikert and Douglas Godfrey. May 1955. 60p. diagrs., photos., tab. (NACA TN 3444)

### SLIDING CONTACT SURFACES (3.8.2)

**FRICTION, WEAR, AND SURFACE DAMAGE OF METALS AS AFFECTED BY SOLID SURFACE FILMS.** Edmond E. Bisson, Robert L. Johnson, Max A. Swikert and Douglas Godfrey. May 1955. 60p. diagrs., photos., tab. (NACA TN 3444)

### SLEEVE BEARINGS (3.8.2.1)

**ANALYTICAL DERIVATION AND EXPERIMENTAL EVALUATION OF SHORT-BEARING APPROXIMATION FOR FULL JOURNAL BEARINGS.** George B. DuBois and Fred W. Ocvirk, Cornell Univ. 1953. ii, 32p. diagrs., photos., 4 tabs. (NACA Rept. 1157. Formerly TN 2808; TN 2809)

**FUNDAMENTAL STUDY OF EROSION CAUSED BY STEEP PRESSURE WAVES.** B. G. Rightmire and J. M. Bonneville, Massachusetts Institute of Technology. June 1954. 30p. diagrs., photos., 2 tabs. (NACA TN 3214)

**EXPERIMENTAL INVESTIGATION OF MISALIGNING COUPLES AND ECCENTRICITY AT ENDS OF MISALIGNED PLAIN BEARINGS.** G. B. DuBois, F. W. Ocvirk and R. L. Wehe, Cornell University. February 1955. 81p. diagrs., photo., 3 tabs. (NACA TN 3352)

## ROLLING CONTACT SURFACES (3.8.3)

### ANTIFRICTION BEARINGS (3. 8. 3. 1)

COMPARISON OF PERFORMANCE OF EXPERIMENTAL AND CONVENTIONAL CAGE DESIGNS AND MATERIALS FOR 75-MILLIMETER-BORE CYLINDRICAL ROLLER BEARINGS AT HIGH SPEEDS. William J. Anderson, E. Fred Macks and Zolton N. Nemeth. 1954. ii, 15p. diags., 6 tabs. (NACA Rept. 1177. Formerly TN 3001; TN 3002)

INVESTIGATION OF TEMPERATURE LIMITATION OF VARIOUS LUBRICANTS FOR HIGH-TEMPERATURE 20-MILLIMETER-BORE BALL BEARINGS. Z. N. Nemeth and W. J. Anderson. January 1955. 31p. diags., photos., 2 tabs. (NACA TN 3337)

FRICTION, WEAR, AND SURFACE DAMAGE OF METALS AS AFFECTED BY SOLID SURFACE FILMS. Edmond E. Bisson, Robert L. Johnson, Max A. Swikert and Douglas Godfrey. May 1955. 60p. diags., photos., tab. (NACA TN 3444)

## SLIDING AND ROLLING CONTACT SURFACES (3.8.4)

COMPARISON OF PERFORMANCE OF EXPERIMENTAL AND CONVENTIONAL CAGE DESIGNS AND MATERIALS FOR 75-MILLIMETER-BORE CYLINDRICAL ROLLER BEARINGS AT HIGH SPEEDS. William J. Anderson, E. Fred Macks and Zolton N. Nemeth. 1954. ii, 15p. diags., 6 tabs. (NACA Rept. 1177. Formerly TN 3001; TN 3002)

INVESTIGATION OF TEMPERATURE LIMITATION OF VARIOUS LUBRICANTS FOR HIGH-TEMPERATURE 20-MILLIMETER-BORE BALL BEARINGS. Z. N. Nemeth and W. J. Anderson. January 1955. 31p. diags., photos., 2 tabs. (NACA TN 3337)

## LUBRICANTS (3.8.5)

EFFECTS OF CHEMICALLY ACTIVE ADDITIVES ON BOUNDARY LUBRICATION OF STEEL BY SILICONES. S. F. Murray and Robert L. Johnson. August 1954. 24p. diags., photos., tab. (NACA TN 3257)

FRICTION OF POSSIBLE SOLID LUBRICANTS WITH VARIOUS CRYSTAL STRUCTURES. Marshall B. Peterson and Robert L. Johnson. December 1954. 32p. diags., photos., 2 tabs. (NACA TN 3334)

INVESTIGATION OF TEMPERATURE LIMITATION OF VARIOUS LUBRICANTS FOR HIGH-TEMPERATURE 20-MILLIMETER-BORE BALL BEARINGS. Z. N. Nemeth and W. J. Anderson. January 1955. 31p. diags., photos., 2 tabs. (NACA TN 3337)

BOUNDARY LUBRICATION OF STEEL WITH FLUORINE- AND CHLORINE-SUBSTITUTED METHANE AND ETHANE GASES. S. F. Murray, Robert L. Johnson and Max A. Swikert. February 1955. 17p. photos., diags., 2 tabs. (NACA TN 3402)

FRICTION, WEAR, AND SURFACE DAMAGE OF METALS AS AFFECTED BY SOLID SURFACE FILMS. Edmond E. Bisson, Robert L. Johnson, Max A. Swikert and Douglas Godfrey. May 1955. 60p. diags., photos., tab. (NACA TN 3444)



## Heat Transfer (3.9)

COMPARISON OF THEORETICALLY AND EXPERIMENTALLY DETERMINED EFFECTS OF OXIDE COATINGS SUPPLIED BY FUEL ADDITIVES ON UNCOOLED TURBINE-BLADE TEMPERATURE DURING TRANSIENT TURBOJET-ENGINE OPERATION. Louis J. Schafer, Jr., Francis S. Stepka and W. Byron Brown. March 1953. 45p. photos., diagrs., tab. (NACA RM E53A19)

SOME MEASUREMENTS OF BOILING BURN-OUT. Warren H. Lowdermilk and Walter F. Weiland. February 1955. 18p. diagrs., photo., 3 tabs. (NACA RM E54K10)

SIMILAR SOLUTIONS FOR THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH HEAT TRANSFER AND PRESSURE GRADIENT. Clarence B. Cohen and Eli Reshotko. February 1955. 67p. diagrs., 2 tabs. (NACA TN 3325)

REVIEW OF EXPERIMENTAL INVESTIGATIONS OF LIQUID-METAL HEAT TRANSFER. Bernard Lubarsky and Samuel J. Kaufmann. March 1955. 115p. diagrs., tab. (NACA TN 3336)

THE COMPRESSIBLE LAMINAR BOUNDARY LAYER WITH HEAT TRANSFER AND ARBITRARY PRESSURE GRADIENT. Clarence B. Cohen and Eli Reshotko. April 1955. 43p. diagrs., 2 tabs. (NACA TN 3326)

A SELF-EXCITED, ALTERNATING-CURRENT, CONSTANT-TEMPERATURE HOT-WIRE ANEMOMETER. Charles E. Shepard. April 1955. 29p. diagrs., photos. (NACA TN 3406)

## THEORY AND EXPERIMENT (3.9.1)

DYNAMIC RESPONSE OF TURBINE-BLADE TEMPERATURE TO EXHAUST-GAS TEMPERATURE FOR GAS-TURBINE ENGINES. Richard Hood and William E. Phillips, Jr. February 1952. 41p. photos., diagrs. (NACA RM E52A14)

COMPARISON OF THEORETICALLY AND EXPERIMENTALLY DETERMINED EFFECTS OF OXIDE COATINGS SUPPLIED BY FUEL ADDITIVES ON UNCOOLED TURBINE-BLADE TEMPERATURE DURING TRANSIENT TURBOJET-ENGINE OPERATION. Louis J. Schafer, Jr., Francis S. Stepka and W. Byron Brown. March 1953. 45p. photos., diagrs., tab. (NACA RM E53A19)

COMPARISON OF EFFECTIVENESS OF CONVECTION-, TRANSPIRATION-, AND FILM-COOLING METHODS WITH AIR AS COOLANT. E. R. G. Eckert and John N. B. Livingood. 1954. ii, 17p. diagrs. (NACA Rept. 1182. Formerly TN 3010)

EXPERIMENTAL HEAT-TRANSFER AND FRICTION COEFFICIENTS FOR AIR FLOWING THROUGH STACKS OF PARALLEL FLAT PLATES. Eldon W. Sams and Walter F. Weiland, Jr. August 1954. 33p. diagrs., photo., tab. (NACA RM E54F11)

EXACT SOLUTIONS OF LAMINAR-BOUNDARY-LAYER EQUATIONS WITH CONSTANT PROPERTY VALUES FOR POROUS WALL WITH VARIABLE TEMPERATURE. Patrick L. Donoughe and John N. B. Livingood. September 1954. 42p. diagrs., 2 tabs. (NACA TN 3151)

VAPORIZATION RATES AND DRAG COEFFICIENTS FOR ISOCTANE SPRAYS IN TURBULENT AIR STREAMS. Robert D. Ingebo. October 1954. 39p. diagrs., photos., 3 tabs. (NACA TN 3265)

HEAT TRANSFER BY FREE CONVECTION FROM HORIZONTAL CYLINDERS IN DIATOMIC GASES. (Wärmeübergang bei breiter Strömung am wagrechten Zylinder in zweiatomigen Gasen). R. Hermann. November 1954. 73p. diagrs., photos., 6 tabs. (NACA TM 1366. Trans. from VDI Forschungsheft, No. 379, 1936)

THEORETICAL AND EXPERIMENTAL INVESTIGATION OF HEAT TRANSFER BY LAMINAR NATURAL CONVECTION BETWEEN PARALLEL PLATES. A. F. Lietzke. December 1954. 23p. diagrs. (NACA TN 3328)

AN ANALYTICAL ESTIMATION OF THE EFFECT OF TRANSPIRATION COOLING ON THE HEAT-TRANSFER AND SKIN-FRICTION CHARACTERISTICS OF A COMPRESSIBLE TURBULENT BOUNDARY LAYER. Morris W. Rubesin. December 1954. 56p. diagrs. (NACA TN 3341)

ANALYSIS OF LAMINAR FORCED-CONVECTION HEAT TRANSFER IN ENTRANCE REGION OF FLAT RECTANGULAR DUCTS. E. M. Sparrow. January 1955. 42p. diagrs. (NACA TN 3331)

MEASURED EFFECTIVE THERMAL CONDUCTIVITY OF URANIUM OXIDE POWDER IN VARIOUS GASES AND GAS MIXTURES. J. S. Boegli and R. G. Deissler. March 1955. 20p. diagrs., tab. (NACA RM E54L10)

REVIEW OF EXPERIMENTAL INVESTIGATIONS OF LIQUID-METAL HEAT TRANSFER. Bernard Lubarsky and Samuel J. Kaufmann. March 1955. 115p. diagrs., tab. (NACA TN 3336)

A THEORY FOR PREDICTING THE FLOW OF REAL GASES IN SHOCK TUBES WITH EXPERIMENTAL VERIFICATION. Robert L. Trimpi and Nathaniel B. Cohen. March 1955. 69p. diagrs., photo. (NACA TN 3375)

ONE-DIMENSIONAL CALCULATION OF FLOW IN A ROTATING PASSAGE WITH EJECTION THROUGH A POROUS WALL. E. R. G. Eckert, John N. B. Livingood and Ernst I. Prasse. March 1955. 29p. diagrs., photo. (NACA TN 3408)

ANALYSIS OF FULLY DEVELOPED TURBULENT HEAT TRANSFER AND FLOW IN AN ANNULUS WITH VARIOUS ECCENTRICITIES. Robert G. Deissler and Maynard F. Taylor. May 1955. 42p. diagrs. (NACA TN 3451)

PROPULSION  
134 HEAT TRANSFER (3.9)

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**HEAT EXCHANGERS**  
**(3.9.2)**

ANALYSIS OF LAMINAR FORCED-CONVECTION  
HEAT TRANSFER IN ENTRANCE REGION OF FLAT  
RECTANGULAR DUCTS. E. M. Sparrow. January  
1955. 42p. diags. (NACA TN 3331)

ANALYSIS OF FULLY DEVELOPED TURBULENT  
HEAT TRANSFER AND FLOW IN AN ANNULUS  
WITH VARIOUS ECCENTRICITIES. Robert G.  
Deissler and Maynard F. Taylor. May 1955. 42p.  
diags. (NACA TN 3451)



## Cooling of Engines (3.10)

EXPERIMENTAL INVESTIGATION OF AIR-FLOW UNIFORMITY AND PRESSURE LEVEL ON WIRE CLOTH FOR TRANSPIRATION-COOLING APPLICATIONS. Patrick L. Donoughe and Roy A. McKinnon. July 1952. 28p. diagrs., photos., tab. (NACA RM E52E16)

### GAS-TURBINE SYSTEMS (3.10.2)

EXPERIMENTAL INVESTIGATION OF AIR-FLOW UNIFORMITY AND PRESSURE LEVEL ON WIRE CLOTH FOR TRANSPIRATION-COOLING APPLICATIONS. Patrick L. Donoughe and Roy A. McKinnon. July 1952. 28p. diagrs., photos., tab. (NACA RM E52E16)

COMPARISON OF EFFECTIVENESS OF CONVECTION-, TRANSPIRATION-, AND FILM-COOLING METHODS WITH AIR AS COOLANT. E. R. G. Eckert and John N. B. Livingood. 1954. ii, 17p. diagrs. (NACA Rept. 1182. Formerly TN 3010)

EXPERIMENTS ON TURBULENT FLOW THROUGH CHANNELS HAVING POROUS ROUGH SURFACES WITH OR WITHOUT AIR INJECTION. E. R. G. Eckert, Anthony J. Diaguila and Patrick L. Donoughe. February 1955. 45p. diagrs., photos., tab. (NACA TN 3339)

ANALYTICAL DETERMINATION OF EFFECT OF WATER INJECTION ON POWER OUTPUT OF TURBINE-PROPELLER ENGINE. Albert O. Ross and Merle C. Huppert. March 1955. 29p. diagrs. (NACA TN 3403. Formerly RM E9H17)

### RAM JETS (3.10.3)

EXPERIMENTAL INVESTIGATION OF AIR-FLOW UNIFORMITY AND PRESSURE LEVEL ON WIRE CLOTH FOR TRANSPIRATION-COOLING APPLICATIONS. Patrick L. Donoughe and Roy A. McKinnon. July 1952. 28p. diagrs., photos., tab. (NACA RM E52E16)

## Properties of Gases (3.11)

DETERMINATION OF VISCOSITY OF EXHAUST-GAS MIXTURES AT ELEVATED TEMPERATURES. J. C. Westmoreland, National Bureau of Standards. June 1954. 41p. diags., photo., 10 tabs. (NACA TN 3180)

### KINETIC

#### (3.11.1)

KINETIC TREATMENT OF THE NUCLEATION IN SUPERSATURATED VAPORS. (Kinetische Behandlung der Keimbildung in übersättigten Dämpfen). R. Becker and W. Döring. September 1954. 43p. diags. (NACA TM 1374. Trans. from Annalen der Physik, Ser. 5, v. 24, 1935, p. 719-752).

### THERMODYNAMIC

#### (3.11.2)

KINETIC TREATMENT OF THE NUCLEATION IN SUPERSATURATED VAPORS. (Kinetische Behandlung der Keimbildung in übersättigten Dämpfen). R. Becker and W. Döring. September 1954. 43p. diags. (NACA TM 1374. Trans. from Annalen der Physik, Ser. 5, v. 24, 1935, p. 719-752).

EFFECT OF DISSOCIATION ON THERMODYNAMIC PROPERTIES OF PURE DIATOMIC GASES. Harold W. Woolley, National Bureau of Standards. April 1955. 19p. diags., tab. (NACA TN 3270)



## Accessories and Accessory Functions (3.12)

### FUEL SYSTEMS

#### (3.12.1)

AN EVALUATION OF NON-NEWTONIAN FLOW IN PIPE LINES. Ruth N. Weltmann. February 1955. 40p. diagrs., tab. (NACA TN 3397)

DESIGN AND PERFORMANCE OF THROTTLE-TYPE FUEL CONTROLS FOR ENGINE DYNAMIC STUDIES. Edward W. Otto, Harold Gold and Kirby W. Hiller. April 1955. 39p. diagrs., photo. (NACA TN 3445)

### ROCKET ENGINES

#### (3.12.1.8)

IGNITION-DELAY DETERMINATIONS OF FURFURYL ALCOHOL AND MIXED BUTYL MERCAPTANS WITH VARIOUS WHITE FUMING NITRIC ACIDS USING MODIFIED OPEN-CUP AND SMALL-SCALE ROCKET ENGINE APPARATUS. Dezso J. Ladanyi, Riley O. Miller and Glen Hennings. February 1955. 17p. diagrs., photos., 4 tabs. (NACA RM E53E29)

### IGNITION SYSTEMS

#### (3.12.2)

ALTITUDE-IGNITION LIMIT OF A TURBOJET ENGINE USING A CONDENSER-DISCHARGE IGNITION SYSTEM. John C. Armstrong. October 1951. 5p. diagrs. (NACA RM E51F11)

SPARK IGNITION OF FLOWING GASES. IV - THEORY OF IGNITION IN NONTURBULENT AND TURBULENT FLOW USING LONG-DURATION DISCHARGES. Clyde C. Swett, Jr. August 1954. 29p. diagrs., 2 tabs. (NACA RM E54F29a)

### COOLING SYSTEMS

#### (3.12.5)

SOME MEASUREMENTS OF BOILING BURN-OUT. Warren H. Lowdermilk and Walter F. Weiland. February 1955. 18p. diagrs., photo., 3 tabs. (NACA RM E54K10)

## Vibration and Flutter (3.13)

TRANSVERSE OSCILLATIONS IN A CYLINDRICAL COMBUSTION CHAMBER. Franklin K. Moore and Stephen H. Maslen. October 1954. 25p. diags. (NACA TN 3152)

THE EFFECTS OF VARIOUS PARAMETERS, INCLUDING MACH NUMBER, ON PROPELLER-BLADE FLUTTER WITH EMPHASIS ON STALL FLUTTER. John E. Baker. January 1955. 40p. diags., 3 tabs. (NACA TN 3357. Formerly RM L50L12b)



**AIRCRAFT LOADS  
AND CONSTRUCTION  
(4)**

# **AIRCRAFT LOADS and CONSTRUCTION (4)**

AN EXPERIMENTAL INVESTIGATION OF WHEEL  
SPIN-UP DRAG LOADS. Benjamin Milwitzky, Dean  
C. Lindquist and Dexter M. Potter. September 1954.  
18p. diagrs. (NACA TN 3246. Formerly  
RM L53E06b)



## Loads

### (4.1)

AN EXPERIMENTAL INVESTIGATION OF WHEEL SPIN-UP DRAG LOADS. Benjamin Milwitzky, Dean C. Lindquist and Dexter M. Potter. September 1954. 18p. diags. (NACA TN 3246. Formerly RM L53E06b)

## AERODYNAMIC

### (4.1.1)

FLIGHT DETERMINATION OF THE EFFECTS OF WING VORTEX GENERATORS ON THE AERODYNAMIC CHARACTERISTICS OF THE DOUGLAS D-558-I AIRPLANE. De E. Beeler, Donald R. Bellman and John H. Griffith. August 14, 1951. 23p. diags., photos., tab. (NACA RM L51A23)

AERODYNAMIC CHARACTERISTICS OF A LEADING-EDGE SLAT ON A 35° SWEEPED-BACK WING FOR MACH NUMBERS FROM 0.30 TO 0.88. John A. Kelly and Nora-Lee F. Hayter. December 1951. 49p. diags., tab. (NACA RM A51H23)

PRESSURE PULSATIONS ON RIGID AIRFOILS AT TRANSONIC SPEEDS. Milton D. Humphreys. December 1951. 21p. diags., photos., tab. (NACA RM L51I12)

AN APPLICATION OF THE ROCKET-PROPELLED-MODEL TECHNIQUE TO THE INVESTIGATION OF LOW-LIFT BUFFETING AND THE RESULTS OF PRELIMINARY TESTS. Homer P. Mason and William N. Gardner. September 1952. 19p. diags., photos. (NACA RM L52C27)

THE EFFECTS OF CAMBER AND LEADING-EDGE-FLAP DEFLECTION ON THE PRESSURE PULSATIONS ON THIN RIGID AIRFOILS AT TRANSONIC SPEEDS. Milton D. Humphreys and John D. Kent. October 1952. 26p. diags., photos., tab. (NACA RM L52G22)

TRANSONIC AERODYNAMIC CHARACTERISTICS OF AN NACA 64A006 AIRFOIL SECTION WITH A 15-PERCENT-CHORD LEADING-EDGE FLAP. Milton D. Humphreys. September 1953. 44p. diags., photos. (NACA RM L53G23)

AERODYNAMIC LOADS ON A LEADING-EDGE FLAP AND A LEADING-EDGE SLAT ON THE NACA 64A010 AIRFOIL SECTION. John A. Kelly and George B. McCullough. June 1954. 33p. diags., 8 tabs. (NACA TN 3220)

AN INVESTIGATION OF A LIFTING 10-PERCENT-THICK SYMMETRICAL DOUBLE-WEDGE AIRFOIL AT MACH NUMBERS UP TO 1. Milton D. Humphreys. November 1954. 35p. diags., photos., tab. (NACA TN 3306)

## WINGS

### (4.1.1.1)

EXPERIMENTAL PRESSURE DISTRIBUTIONS OVER WING TIPS AT MACH NUMBER 1.9. I - WING TIP WITH SUBSONIC LEADING EDGE. James M. Jagger and Harold Mirels. January 27, 1949. 28p. diags., photo. (NACA RM E8K26)

ESTIMATION OF LIFT AND DRAG OF AIRFOILS AT NEAR SONIC SPEEDS AND IN THE PRESENCE OF DETACHED SHOCK WAVES. John P. Mayer. February 23, 1949. 23p. diags. (NACA RM L8L07)

AN ANALYSIS OF AVAILABLE DATA ON EFFECTS OF WING-FUSELAGE-TAIL AND WING-NACELLE INTERFERENCE ON THE DISTRIBUTION OF THE AIR LOAD AMONG COMPONENTS OF AIRPLANES. Bertram C. Wollner. April 11, 1949. 33p. diags., tab. (NACA RM L9B10)

TABULATED PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS MEASURED IN FLIGHT ON THE WING OF THE DOUGLAS D-558-I AIRPLANE FOR A 1 g STALL, A SPEED RUN TO A MACH NUMBER OF 0.90, AND A WIND-UP TURN AT A MACH NUMBER OF 0.86. Earl R. Keener and Mary Pierce. December 15, 1950. 40p. diags., photos., 5 tabs. (NACA RM L50J10)

LIFT AND MOMENT CHARACTERISTICS AT SUBSONIC MACH NUMBERS OF FOUR 10-PERCENT-THICK AIRFOIL SECTIONS OF VARYING TRAILING-EDGE THICKNESS. James L. Summers and William A. Page. December 20, 1950. 32p. diags., photos. (NACA RM A50J09)

TABULATED PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS MEASURED IN FLIGHT ON THE WING OF THE DOUGLAS D-558-I AIRPLANE THROUGHOUT THE NORMAL-FORCE-COEFFICIENT RANGE AT MACH NUMBERS OF 0.67, 0.74, 0.78, AND 0.82. Earl R. Keener, James R. Peele and Julia B. Woodbridge. January 29, 1951. 37p. diags., photos., 6 tabs. (NACA RM L50L12a)

PRESSURE-DISTRIBUTION MEASUREMENTS OVER A 45° SWEEPBACK WING AT TRANSONIC SPEEDS BY THE NACA WING-FLOW METHOD. Edward C. B. Danforth and Thomas C. O'Bryan. June 1951. 42p. diags., photos. (NACA RM L51D24)

TABULATED PRESSURE COEFFICIENTS AND AERODYNAMIC CHARACTERISTICS MEASURED IN FLIGHT ON THE WING OF THE D-558-I RESEARCH AIRPLANE THROUGH A MACH NUMBER RANGE OF 0.80 TO 0.89 AND THROUGHOUT THE NORMAL-FORCE-COEFFICIENT RANGE AT MACH NUMBERS OF 0.61, 0.70, 0.855, AND 0.88. Earl R. Keener and Rozalia M. Bandish. August 1951. 43p. diags., photos., 7 tabs. (NACA RM L51F12)

A METHOD FOR THE DESIGN OF SWEEPBACK WINGS WARPED TO PRODUCE SPECIFIED FLIGHT CHARACTERISTICS AT SUPERSONIC SPEEDS. Warren A. Tucker. September 1951. 52p. diags., 2 tabs. (NACA RM L51F08)



**Wings - Aerodynamic (Cont.)**

LOAD DISTRIBUTION OVER A FUSELAGE IN COMBINATION WITH A SWEEP WING AT SMALL ANGLES OF ATTACK AND TRANSONIC SPEEDS. Maurice D. White and Bonne C. Look. November 1951. 26p. diagrs., photo., tab. (NACA RM A51H15)

THE INTERFERENCE EFFECTS OF A BODY ON THE SPANWISE LOAD DISTRIBUTIONS OF TWO 45° SWEEPBACK WINGS OF ASPECT RATIO 8 FROM LOW-SPEED TESTS AT A REYNOLDS NUMBER OF  $4 \times 10^6$ . Albert P. Martina. February 1952. 48p. diagrs., photo., 2 tabs. (NACA RM L51K23)

WING AND FUSELAGE LOADS MEASURED IN FLIGHT ON THE NORTH AMERICAN B-45 AND F-82 AIRPLANES. Paul W. Harper. February 1953. 35p. diagrs., 4 tabs. (NACA RM L52L09)

OSCILLATING PRESSURES NEAR A STATIC PUSHER PROPELLER AT TIP MACH NUMBERS UP TO 1.20 WITH SPECIAL REFERENCE TO THE EFFECTS OF THE PRESENCE OF THE WING. Harvey H. Hubbard and Leslie W. Lassiter. July 1954. 35p. diagrs., photos., tab. (NACA TN 3202)

ON THE KERNEL FUNCTION OF THE INTEGRAL EQUATION RELATING LIFT AND DOWNWASH DISTRIBUTIONS OF OSCILLATING WINGS IN SUPERSONIC FLOW. Charles E. Watkins and Julian H. Berman. May 1955. 43p. (NACA TN 3438)

**Steady Loads****(4.1.1.1.1)**

MEASUREMENTS OF THE WING AND TAIL LOADS DURING THE ACCEPTANCE TESTS OF BELL XS-1 RESEARCH AIRPLANE. De E. Beeler and John P. Mayer. April 13, 1948. 25p. diagrs., photos., 2 tabs. (NACA RM L7L12)

INVESTIGATION AT SUPERSONIC SPEED ( $M = 1.53$ ) OF THE PRESSURE DISTRIBUTION OVER A 63° SWEEP AIRFOIL OF BICONVEX SECTION AT ZERO LIFT. Charles W. Frick and John W. Boyd. June 10, 1948. 33p. diagrs., photos. (NACA RM A8C22)

INVESTIGATION AT SUPERSONIC SPEED ( $M = 1.53$ ) OF THE PRESSURE DISTRIBUTION OVER A 63° SWEEP AIRFOIL OF BICONVEX SECTION AT SEVERAL ANGLES OF ATTACK. John W. Boyd, Elliott D. Katzen and Charles W. Frick. September 24, 1948. 41p. diagrs., photos., tab. (NACA RM A8F22)

PRESSURE-DISTRIBUTION DATA FOR THE NACA 64<sub>1</sub>-012 AND 64<sub>1</sub>A012 AIRFOILS AT HIGH SUBSONIC MACH NUMBERS. Milton D. Humphreys. May 6, 1949. 37p. photos., diagrs., 8 tabs. (NACA RM L9C16)

EXPERIMENTAL PRESSURE DISTRIBUTIONS OVER WING TIPS AT MACH NUMBER 1.9. II - WING TIP WITH SUBSONIC TRAILING EDGE. Harold Mirels and James M. Jagger. December 21, 1949. 23p. diagrs., photo. (NACA RM E9I22a)

INVESTIGATION AT MACH NUMBER 1.62 OF THE PRESSURE DISTRIBUTION OVER A RECTANGULAR WING WITH SYMMETRICAL CIRCULAR-ARC SECTION AND 30-PERCENT-CHORD TRAILING-EDGE FLAP. K. R. Czarnecki and James N. Mueller. January 25, 1950. 81p. diagrs., photos. (NACA RM L9J05)

INVESTIGATION AT HIGH SUBSONIC SPEEDS OF METHODS OF ALLEVIATING THE ADVERSE INTERFERENCE AT THE ROOT OF A SWEEPBACK WING. Lee E. Boddy. August 10, 1950. 31p. diagrs., photos. (NACA RM A50E26)

PRESSURE DISTRIBUTIONS OVER A RETRACTED LEADING-EDGE SLAT ON A 40° SWEEPBACK WING AT MACH NUMBERS UP TO 0.9. Jones F. Cahill and Gale C. Oberndorfer. January 26, 1951. 36p. diagrs. (NACA RM L50L04a)

PRESSURE DISTRIBUTION AT LOW SPEED ON A 1/4-SCALE BELL X-5 AIRPLANE MODEL. William B. Kemp, Jr. and Albert G. Few, Jr. December 1951. 86p. diagrs., photos. (NACA RM L51I25)

THE CALCULATION OF CERTAIN STATIC AEROELASTIC PHENOMENA OF WINGS WITH TIP TANKS OR BOOM-MOUNTED LIFTING SURFACES. Franklin W. Diederich and Kenneth A. Foss. August 1952. 55p. diagrs., 2 tabs. (NACA RM L52A22)

AERODYNAMIC FORCES AND LOADINGS ON SYMMETRICAL CIRCULAR-ARC AIRFOILS WITH PLAIN LEADING-EDGE AND PLAIN TRAILING-EDGE FLAPS. Jones F. Cahill, William J. Underwood, Robert J. Nuber and Gail A. Cheesman. 1953. ii, 38p. diagrs., photos., 5 tabs. (NACA Rept. 1146. Formerly RM L6K22; RM L7H04; RM L50H17a)

SOME NOTES ON THE AERODYNAMIC LOADS ASSOCIATED WITH EXTERNAL-STORE INSTALLATIONS. H. Norman Silvers and Thomas C. O'Bryan. June 1953. 17p. diagrs. (NACA RM L53E06a)

**Maneuvering****(4.1.1.1.2)**

MEASUREMENTS OF THE WING AND TAIL LOADS DURING THE ACCEPTANCE TESTS OF BELL XS-1 RESEARCH AIRPLANE. De E. Beeler and John P. Mayer. April 13, 1948. 25p. diagrs., photos., 2 tabs. (NACA RM L7L12)

A FLIGHT EVALUATION OF THE LONGITUDINAL STABILITY CHARACTERISTICS ASSOCIATED WITH THE PITCH-UP OF A SWEEP-WING AIRPLANE IN MANEUVERING FLIGHT AT TRANSONIC SPEEDS. Seth B. Anderson and Richard S. Bray. November 1951. 33p. diagrs., photo., tab. (NACA RM A51I12)

WING AND FUSELAGE LOADS MEASURED IN FLIGHT ON THE NORTH AMERICAN B-45 AND F-82 AIRPLANES. Paul W. Harper. February 1953. 35p. diagrs., 4 tabs. (NACA RM L52L09)

MATRIX METHODS FOR DETERMINING THE LONGITUDINAL-STABILITY DERIVATIVES OF AN AIRPLANE FROM TRANSIENT FLIGHT DATA. James J. Donegan. 1954. ii, 20p. diagrs., 6 tabs. (NACA Rept. 1169. Formerly TN 2902)

THEORETICAL ANALYSIS OF AN AIRPLANE ACCELERATION RESTRICTOR CONTROLLED BY NORMAL ACCELERATION, PITCHING ACCELERATION, AND PITCHING VELOCITY. Christopher C. Kraft, Jr. September 1954. 42p. diagrs., 3 tabs. (NACA TN 3243)

GENERALIZED INDICIAL FORCES ON DEFORMING RECTANGULAR WINGS IN SUPERSONIC FLIGHT. Harvard Lomax, Franklyn B. Fuller and Loma Sluder. November 1954. 74p. diagrs., tab. (NACA TN 3286)



Maneuvering - Aerodynamic  
(Cont.)

OPERATING CHARACTERISTICS OF AN ACCELERATION RESTRICTOR AS DETERMINED BY MEANS OF A SIMULATOR. Arthur Assadourian. December 1954. 20p. diagrs., photos. (NACA TN 3319)

SOME CONSIDERATIONS ON TWO-DIMENSIONAL THIN AIRFOILS DEFORMING IN SUPERSONIC FLOW. Eugene Migotsky. January 1955. 36p. diagrs. (NACA TN 3386)

AN ANALYSIS OF ACCELERATIONS, AIRSPEEDS, AND GUST VELOCITIES FROM THREE COMMERCIAL OPERATIONS OF ONE TYPE OF MEDIUM-ALTITUDE TRANSPORT AIRPLANE. Thomas L. Coleman, Martin R. Copp, Walter G. Walker and Jerome N. Engel. March 1955. 31p. diagrs., 4 tabs. (NACA TN 3365)

Gust Loads  
(4.1.1.1.3)

A COMPARISON OF GUST LOADS MEASURED IN FLIGHT ON A SWEEP-WING AIRPLANE AND AN UNSWEEP-WING AIRPLANE. Jack Funk and Harry C. Mickleboro. June 1953. 16p. diagrs., 2 tabs. (NACA RM L52L02)

LIFT DEVELOPED ON UNRESTRAINED RECTANGULAR WINGS ENTERING GUSTS AT SUBSONIC AND SUPERSONIC SPEEDS. Harvard Lomax. 1954. ii, 16p. diagrs., 5 tabs. (NACA Rept. 1162. Formerly TN 2925)

A STUDY OF THE APPLICATION OF POWER-SPECTRAL METHODS OF GENERALIZED HARMONIC ANALYSIS TO GUST LOADS ON AIRPLANES. Harry Press and Bernard Mazelsky. 1954. ii, 17p. diagrs., 2 tabs. (NACA Rept. 1172. Formerly TN 2853)

AN INVESTIGATION OF THE USE OF ROCKET-POWERED MODELS FOR GUST-LOAD STUDIES WITH AN APPLICATION TO A TAILLESS SWEEP-WING MODEL AT TRANSONIC SPEEDS. A. James Vitale, H. Press and C. C. Shufflebarger. June 1954. 36p. diagrs., photos., tab. (NACA TN 3161)

SOME MEASUREMENTS OF ATMOSPHERIC TURBULENCE OBTAINED FROM FLOW-DIRECTION VANES MOUNTED ON AN AIRPLANE. Robert G. Chilton. November 1954. 22p. diagrs., photo., tab. (NACA TN 3313)

GUST EXPERIENCE OF A HELICOPTER AND AN AIRPLANE IN FORMATION FLIGHT. Almer D. Crim. December 1954. 12p. diagrs., photos., 2 tabs. (NACA TN 3354)

GUST-LOAD AND AIRSPEED DATA FROM ONE TYPE OF FOUR-ENGINE AIRPLANE ON FIVE ROUTES FROM 1947 TO 1954. Walter G. Walker. January 1955. 28p. diagrs., 4 tabs. (NACA TN 3358)

ANALYSIS OF ACCELERATIONS, GUST VELOCITIES, AND AIRSPEEDS FROM OPERATIONS OF A TWIN-ENGINE TRANSPORT AIRPLANE ON A TRANSCONTINENTAL ROUTE FROM 1950 TO 1952. Thomas L. Coleman and Walter G. Walker. February 1955. 16p. diagrs., 3 tabs. (NACA TN 3371)

ESTIMATES OF PROBABILITY DISTRIBUTION OF ROOT-MEAN-SQUARE GUST VELOCITY OF ATMOSPHERIC TURBULENCE FROM OPERATIONAL GUST-LOAD DATA BY RANDOM-PROCESS THEORY. Harry Press, May T. Meadows and Ivan Hadlock. March 1955. 48p. diagrs., 4 tabs. (NACA TN 3362)

AN ANALYSIS OF ACCELERATIONS, AIRSPEEDS, AND GUST VELOCITIES FROM THREE COMMERCIAL OPERATIONS OF ONE TYPE OF MEDIUM-ALTITUDE TRANSPORT AIRPLANE. Thomas L. Coleman, Martin R. Copp, Walter G. Walker and Jerome N. Engel. March 1955. 31p. diagrs., 4 tabs. (NACA TN 3365)

TAIL  
(4.1.1.2)

AN ANALYSIS OF AVAILABLE DATA ON EFFECTS OF WING-FUSELAGE-TAIL AND WING-NACELLE INTERFERENCE ON THE DISTRIBUTION OF THE AIR LOAD AMONG COMPONENTS OF AIRPLANES. Bertram C. Wollner. April 11, 1949. 33p. diagrs., tab. (NACA RM L9B10)

A VECTOR STUDY OF LINEARIZED SUPERSONIC FLOW APPLICATIONS TO NONPLANAR PROBLEMS. John C. Martin. 1953. ii, 34p. diagrs., tab. (NACA Rept. 1143. Formerly TN 2641)

APPLICATION OF TWO-DIMENSIONAL VORTEX THEORY TO THE PREDICTION OF FLOW FIELDS BEHIND WINGS OF WING-BODY COMBINATIONS AT SUBSONIC AND SUPERSONIC SPEEDS. Arthur Wm. Rogers. September 1954. (ii), 91p. diagrs., photo., 3 tabs. (NACA TN 3227)

THEORETICAL CALCULATIONS OF THE LATERAL STABILITY DERIVATIVES FOR TRIANGULAR VERTICAL TAILS WITH SUBSONIC LEADING EDGES TRAVELING AT SUPERSONIC SPEEDS. Percy J. Bobbitt. December 1954. 68p. diagrs., photos., 5 tabs. (NACA TN 3240)

GENERAL THEORY OF CONICAL FLOWS AND ITS APPLICATION TO SUPERSONIC AERODYNAMICS. (La théorie générale des mouvements coniques et ses applications à l'aérodynamique supersonique). Paul Germain. PREFACE. M. J. Peres. January 1955. vii, 333p. diagrs. (NACA TM 1354. Trans. from Office National d'Études et de Recherches Aéronautiques, Pub. 34, 1949)

THEORETICAL CALCULATIONS OF THE PRESSURES, FORCES, AND MOMENTS DUE TO VARIOUS LATERAL MOTIONS ACTING ON THIN ISOLATED VERTICAL TAILS WITH SUPERSONIC LEADING AND TRAILING EDGES. Kenneth Margolis. March 1955. 43p. diagrs., 10 tabs. (NACA TN 3373)

Steady Loads  
(4.1.1.2.1)

MEASUREMENTS OF THE WING AND TAIL LOADS DURING THE ACCEPTANCE TESTS OF BELL XS-1 RESEARCH AIRPLANE. De E. Beeler and John P. Mayer. April 13, 1948. 25p. diagrs., photos., 2 tabs. (NACA RM L7L12)



**Steady Loads - Aerodynamic  
(Cont.)**

EFFECT OF HORIZONTAL-TAIL SPAN AND VERTICAL LOCATION ON THE AERODYNAMIC CHARACTERISTICS OF AN UNSWEPT TAIL ASSEMBLY IN SIDESLIP. Donald R. Riley. 1954. ii, 20p. diags., photos., tab. (NACA Rept. 1171. Formerly TN 2907)

CALCULATED SUBSONIC SPAN LOADS AND RESULTING STABILITY DERIVATIVES OF UNSWEPT AND 45° SWEPTBACK TAIL SURFACES IN SIDESLIP AND IN STEADY ROLL. M. J. Queijo and Donald R. Riley. October 1954. 110p. diags., 2 tabs. (NACA TN 3245)

PREDICTION OF DOWNWASH BEHIND SWEPT-WING AIRPLANES AT SUBSONIC SPEED. John DeYoung and Walter H. Barling, Jr. January 1955. 104p. diags., 3 tabs. (NACA TN 3346)

**Maneuvering  
(4. 1. 1. 2. 2)**

MEASUREMENTS OF THE WING AND TAIL LOADS DURING THE ACCEPTANCE TESTS OF BELL XS-1 RESEARCH AIRPLANE. De E. Beeler and John P. Mayer. April 13, 1948. 25p. diags., photos., 2 tabs. (NACA RM L7L12)

A FLIGHT EVALUATION OF THE LONGITUDINAL STABILITY CHARACTERISTICS ASSOCIATED WITH THE PITCH-UP OF A SWEPT-WING AIRPLANE IN MANEUVERING FLIGHT AT TRANSONIC SPEEDS. Seth B. Anderson and Richard S. Bray. November 1951. 33p. diags., photo., tab. (NACA RM A51I12)

THE UNSYMMETRICAL LOAD AND BENDING MOMENT ON THE HORIZONTAL TAIL OF A JET-POWERED BOMBER MEASURED IN SIDESLIPPING FLIGHT. T. V. Cooney. January 1952. 19p. diags., tab. (NACA RM L51J24)

THE VERTICAL-TAIL LOADS MEASURED DURING A FLIGHT INVESTIGATION ON A JET-POWERED BOMBER AIRPLANE. T. V. Cooney. May 1953. 32p. diags., photo. (NACA RM L52G21)

MATRIX METHODS FOR DETERMINING THE LONGITUDINAL-STABILITY DERIVATIVES OF AN AIRPLANE FROM TRANSIENT FLIGHT DATA. James J. Donegan. 1954. ii, 20p. diags., 6 tabs. (NACA Rept. 1169. Formerly TN 2902)

EFFECT OF LAG OF SIDEWASH ON THE VERTICAL-TAIL CONTRIBUTION TO OSCILLATORY DAMPING IN YAW OF AIRPLANE MODELS. Lewis R. Fisher and Herman S. Fletcher. January 1955. 38p. diags., photos. (NACA TN 3356)

**Buffeting and Gust  
(4. 1. 1. 2. 3)**

MEASUREMENTS OF THE WING AND TAIL LOADS DURING THE ACCEPTANCE TESTS OF BELL XS-1 RESEARCH AIRPLANE. De E. Beeler and John P. Mayer. April 13, 1948. 25p. diags., photos., 2 tabs. (NACA RM L7L12)

STABILITY RESULTS OBTAINED WITH DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN FLIGHT UP TO A MACH NUMBER OF 0.89. William H. Barlow and Howard C. Lilly. April 22, 1949. 16p. diags., photos. (NACA RM L8K03)

LIFT AND MOMENT CHARACTERISTICS AT SUBSONIC MACH NUMBERS OF FOUR 10-PERCENT-THICK AIRFOIL SECTIONS OF VARYING TRAILING-EDGE THICKNESS. James L. Summers and William A. Page. December 20, 1950. 32p. diags., photos. (NACA RM A50J09)

BUFFETING-LOAD MEASUREMENTS ON A JET-POWERED BOMBER AIRPLANE WITH REFLEXED FLAPS. John A. See and William S. Aiken, Jr. August 1951. 28p. diags., 3 tabs. (NACA RM L51E24a)

PRELIMINARY INVESTIGATION OF THE PRESSURE FLUCTUATIONS IN THE WAKES OF TWO-DIMENSIONAL WINGS AT LOW ANGLES OF ATTACK. Robert M. Sorenson, John A. Wyss and James C. Kyle. October 1951. 58p. diags., photos. (NACA RM A51G10)

AN APPLICATION OF THE ROCKET-PROPELLED-MODEL TECHNIQUE TO THE INVESTIGATION OF LOW-LIFT BUFFETING AND THE RESULTS OF PRELIMINARY TESTS. Homer P. Mason and William N. Gardner. September 1952. 19p. diags., photos. (NACA RM L52C27)

MEASUREMENTS OF FLUCTUATING PRESSURES ON A 1/4-SCALE MODEL OF THE X-1 AIRPLANE WITH A 10-PERCENT-THICK WING IN THE LANGLEY 16-FOOT TRANSONIC TUNNEL. Louis W. Habel and Seymour Steinberg. January 1953. 29p. diags., photos. (NACA RM L52J31)

SOME MEASUREMENTS OF ATMOSPHERIC TURBULENCE OBTAINED FROM FLOW-DIRECTION VANES MOUNTED ON AN AIRPLANE. Robert G. Chilton. November 1954. 22p. diags., photo., tab. (NACA TN 3313)

ESTIMATES OF PROBABILITY DISTRIBUTION OF ROOT-MEAN-SQUARE GUST VELOCITY OF ATMOSPHERIC TURBULENCE FROM OPERATIONAL GUST-LOAD DATA BY RANDOM-PROCESS THEORY. Harry Press, May T. Meadows and Ivan Hadlock. March 1955. 48p. diags., 4 tabs. (NACA TN 3362)

**FUSELAGE, NACELLES,  
AND CANOPIES  
(4. 1. 1. 3)**

AN EXPERIMENTAL INVESTIGATION OF NACA SUBMERGED INLETS AT HIGH SUBSONIC SPEEDS. I - INLETS FORWARD OF THE WING LEADING EDGE. Charles F. Hall and F. Dorn Barclay. June 9, 1948. 64p. diags., photos. (NACA RM A8B16)

AN ANALYSIS OF AVAILABLE DATA ON EFFECTS OF WING-FUSELAGE-TAIL AND WING-NACELLE INTERFERENCE ON THE DISTRIBUTION OF THE AIR LOAD AMONG COMPONENTS OF AIRPLANES. Bertram C. Wollner. April 11, 1949. 33p. diags., tab. (NACA RM L9B10)



## Fuselage, Nacelles, and Canopies (Cont.)

EFFECT OF AIRFOIL SECTION AND TIP TANKS ON THE AERODYNAMIC CHARACTERISTICS AT HIGH SUBSONIC SPEEDS OF AN UNSWEPT WING OF ASPECT RATIO 5.16 AND TAPER RATIO 0.61. H. Norman Silvers and Kenneth P. Spreemann. December 1, 1949. 30p. diags., photos., 2 tabs. (NACA RM L9J04)

AN INVESTIGATION OF THREE TRANSONIC FUSELAGE AIR INLETS AT MACH NUMBERS FROM 0.4 TO 0.94 AND AT A MACH NUMBER OF 1.19. Robert E. Pendley, Harold L. Robinson and Claude V. Williams. November 7, 1950. 51p. diags., photos., 3 tabs. (NACA RM L50H24)

LOAD DISTRIBUTION OVER A FUSELAGE IN COMBINATION WITH A SWEPT WING AT SMALL ANGLES OF ATTACK AND TRANSONIC SPEEDS. Maurice D. White and Bonne C. Look. November 1951. 26p. diags., photo., tab. (NACA RM A51H15)

PRESSURE DISTRIBUTION AT LOW SPEED ON A 1/4-SCALE BELL X-5 AIRPLANE MODEL. William B. Kemp, Jr. and Albert G. Few, Jr. December 1951. 86p. diags., photos. (NACA RM L51I25)

PRESSURE DISTRIBUTIONS ON BODIES OF REVOLUTION AT SUBSONIC AND TRANSONIC SPEEDS. Richard I. Cole. July 1952. 47p. diags., photos., tab. (NACA RM L52D30)

A COMPARISON OF THE EXPERIMENTAL SUBSONIC PRESSURE DISTRIBUTIONS ABOUT SEVERAL BODIES OF REVOLUTION WITH PRESSURE DISTRIBUTIONS COMPUTED BY MEANS OF THE LINEARIZED THEORY. Clarence W. Matthews. 1953. ii, 29p. diags., tab. (NACA Rept. 1155. Formerly TN 2519; RM L9F28)

WING AND FUSELAGE LOADS MEASURED IN FLIGHT ON THE NORTH AMERICAN B-45 AND F-82 AIRPLANES. Paul W. Harper. February 1953. 35p. diags., 4 tabs. (NACA RM L52L09)

SOME NOTES ON THE AERODYNAMIC LOADS ASSOCIATED WITH EXTERNAL-STORE INSTALLATIONS. H. Norman Silvers and Thomas C. O'Bryan. June 1953. 17p. diags. (NACA RM L53E06a)

OSCILLATING PRESSURES NEAR A STATIC PUSHER PROPELLER AT TIP MACH NUMBERS UP TO 1.20 WITH SPECIAL REFERENCE TO THE EFFECTS OF THE PRESENCE OF THE WING. Harvey H. Hubbard and Leslie W. Lassiter. July 1954. 35p. diags., photos., tab. (NACA TN 3202)

AN INVESTIGATION OF SEVERAL NACA 1-SERIES NOSE INLETS WITH AND WITHOUT PROTRUDING CENTRAL BODIES AT HIGH-SUBSONIC MACH NUMBERS AND AT A MACH NUMBER OF 1.2. Robert E. Pendley and Harold L. Robinson. May 1955. 51p. diags., photos. (NACA TN 3436. Formerly RM L9L23a)

## ROTATING WINGS

### (4.1.1.4)

DESCRIPTION AND INVESTIGATION OF A DYNAMIC MODEL OF THE XH-17 TWO-BLADE JET-DRIVEN HELICOPTER. George W. Brooks and Maurice A. Sylvester. March 14, 1951. 49p. diags., photos., 6 tabs. (NACA RM L50I21)

REVIEW OF INFORMATION ON INDUCED FLOW OF A LIFTING ROTOR. Alfred Gessow. August 1954. 16p. diags., photo., tab. (NACA TN 3238)

GUST EXPERIENCE OF A HELICOPTER AND AN AIRPLANE IN FORMATION FLIGHT. Almer D. Crim. December 1954. 12p. diags., photos., 2 tabs. (NACA TN 3354)

THE EFFECT OF CONTROL STIFFNESS AND FORWARD SPEED ON THE FLUTTER OF A 1/10-SCALE DYNAMIC MODEL OF A TWO-BLADE JET-DRIVEN HELICOPTER ROTOR. George W. Brooks and Maurice A. Sylvester. April 1955. 38p. diags., photo., 3 tabs. (NACA TN 3376)

A STUDY OF NORMAL ACCELERATIONS AND OPERATING CONDITIONS EXPERIENCED BY HELICOPTERS IN COMMERCIAL AND MILITARY OPERATIONS. Marlin E. Hazen. April 1955. 34p. diags., photos., 5 tabs. (NACA TN 3434)

A DYNAMIC-MODEL STUDY OF THE EFFECT OF ADDED WEIGHTS AND OTHER STRUCTURAL VARIATIONS ON THE BLADE BENDING STRAINS OF AN EXPERIMENTAL TWO-BLADE JET-DRIVEN HELICOPTER IN HOVERING AND FORWARD FLIGHT. John Locke McCarty and George W. Brooks. May 1955. i, 47p. diags., photo., 6 tabs. (NACA TN 3367)

## AEROELASTICITY

### (4.1.1.5)

PRELIMINARY STUDY OF SOME FACTORS WHICH AFFECT THE STALL-FLUTTER CHARACTERISTICS OF THIN WINGS. A. Gerald Rainey. July 1952. 33p. diags., photo., tab. (NACA RM L52D08)

THE CALCULATION OF CERTAIN STATIC AEROELASTIC PHENOMENA OF WINGS WITH TIP TANKS OR BOOM-MOUNTED LIFTING SURFACES. Franklin W. Diederich and Kenneth A. Foss. August 1952. 55p. diags., 2 tabs. (NACA RM L52A22)

SOME OBSERVATIONS ON STALL FLUTTER AND BUFFETING. A. Gerald Rainey. June 1953. 11p. diags. (NACA RM L53E15)

LIFT AND MOMENT EQUATIONS FOR OSCILLATING AIRFOILS IN AN INFINITE UNSTAGGERED CASCADE. Alexander Mendelson and Robert W. Carroll. October 1954. 46p. diags., 3 tabs. (NACA TN 3263)

GENERALIZED INDICIAL FORCES ON DEFORMING RECTANGULAR WINGS IN SUPERSONIC FLIGHT. Harvard Lomax, Franklyn B. Fuller and Loma Sluder. November 1954. 74p. diags., tab. (NACA TN 3286)



## Aeroelasticity (Cont.)

AN EXPLORATORY INVESTIGATION OF SOME TYPES OF AEROELASTIC INSTABILITY OF OPEN AND CLOSED BODIES OF REVOLUTION MOUNTED ON SLENDER STRUTS. S. A. Clevenson, E. Widmayer, Jr. and Franklin W. Diederich. November 1954. 44p. diagrs., photos., 3 tabs. (NACA TN 3308. Formerly RM L53E07)

DESCRIPTION AND ANALYSIS OF A ROCKET-VEHICLE EXPERIMENT ON FLUTTER INVOLVING WING DEFORMATION AND BODY MOTIONS. H. J. Cunningham and R. R. Lundstrom. January 1955. 26p. diagrs., photos., 2 tabs. (NACA TN 3311. Formerly RM L50I29)

SOME CONSIDERATIONS ON TWO-DIMENSIONAL THIN AIRFOILS DEFORMING IN SUPERSONIC FLOW. Eugene Migotsky. January 1955. 36p. diagrs. (NACA TN 3386)

A SIMPLIFIED METHOD FOR CALCULATING AEROELASTIC EFFECTS ON THE ROLL OF AIRCRAFT. John M. Hedgepeth, Paul G. Waner, Jr. and Robert J. Kell. March 1955. 26p. diagrs., 4 tabs. (NACA TN 3370)

METHOD OF CONTROLLING STIFFNESS PROPERTIES OF A SOLID-CONSTRUCTION MODEL WING. Norman S. Land and Frank T. Abbott, Jr. April 1955. 21p. diagrs., photos., tab. (NACA TN 3423)

## LANDING (4.1.2)

AN EXPERIMENTAL INVESTIGATION OF WHEEL SPIN-UP DRAG LOADS. Benjamin Milwitzky, Dean C. Lindquist and Dexter M. Potter. September 1954. 18p. diagrs. (NACA TN 3246. Formerly RM L53E06b)

AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF WHEEL PREROTATION ON LANDING-GEAR DRAG LOADS. Dexter M. Potter. October 1954. 19p. diagrs., photos., tab. (NACA TN 3250)

## IMPACT (4.1.2.1)

ON TRAVELING WAVES IN BEAMS. Robert W. Leonard and Bernard Budiansky. 1954. iii, 27p. diagrs. (NACA Rept. 1173. Formerly TN 2874)

STATISTICAL MEASUREMENTS OF CONTACT CONDITIONS OF 478 TRANSPORT-AIRCRAFT LANDINGS DURING ROUTINE DAYTIME OPERATIONS. Norman S. Silsby. June 1954. 32p. diagrs., photos., 3 tabs. (NACA TN 3194)

## Land (4.1.2.1.1)

ANALYSIS OF LANDING-GEAR BEHAVIOR. Benjamin Milwitzky and Francis E. Cook. 1953. iii, 45p. diagrs., photo., 3 tabs. (NACA Rept. 1154. Formerly TN 2755)

DROP HAMMER TESTS WITH THREE OLEO STRUT MODELS AND THREE DIFFERENT SHOCK STRUT OILS AT LOW TEMPERATURES. (Fallhammerversuche mit drei Ölfederstrebenmustern und drei verschiedenen Federstrebenölen bei tiefen Temperaturen). Kranz. July 1954. 55p. diagrs., photos., 10 tabs. (NACA TM 1372. Trans. from Zentrale für wissenschaftliches Berichtswesen der Luftfahrtforschung, Berlin, UM 564, Jan. 17, 1939)

CONSIDERATIONS ON A LARGE HYDRAULIC JET CATAPULT. Upshur T. Joyner and Walter B. Horne. July 1954. 49p. diagrs., photos., tab. (NACA TN 3203. Formerly RM L51B27)

AN EXPERIMENTAL INVESTIGATION OF WHEEL SPIN-UP DRAG LOADS. Benjamin Milwitzky, Dean C. Lindquist and Dexter M. Potter. September 1954. 18p. diagrs. (NACA TN 3246. Formerly RM L53E06b)

THE INFLUENCE OF WHEEL SPIN-UP ON LANDING-GEAR IMPACT. W. Flüge and C. W. Coale, Stanford University. October 1954. ii, 107p. diagrs., 8 tabs. (NACA TN 3217. Continuation of TN 2743)

AN EVALUATION OF AN ACCELEROMETER METHOD FOR OBTAINING LANDING-GEAR DRAG LOADS. Jerome G. Theisen and Philip M. Edge, Jr. October 1954. 22p. diagrs., photos. (NACA TN 3247)

AN EXPERIMENTAL INVESTIGATION OF THE EFFECT OF WHEEL PREROTATION ON LANDING-GEAR DRAG LOADS. Dexter M. Potter. October 1954. 19p. diagrs., photos., tab. (NACA TN 3250)

ON FORCE-DEFLECTION DIAGRAMS OF AIRPLANE SHOCK ABSORBER STRUTS. FIRST, SECOND, AND THIRD PARTIAL REPORTS. (Zur Kenntnis der Kraftwegdiagramme von Flugzeugfederbeinen). K. Schlaefke. November 1954. 48p. diagrs., 4 tabs. (NACA TM 1373. Trans. from Technische Berichte, v. 11, nos. 2, 4, & 5, 1944)

AN EXPERIMENTAL STUDY OF ORIFICE COEFFICIENTS, INTERNAL STRUT PRESSURES, AND LOADS ON A SMALL OLEO-PNEUMATIC SHOCK STRUT. James H. Walls. April 1955. 23p. diagrs., photos. (NACA TN 3426)

A STUDY OF NORMAL ACCELERATIONS AND OPERATING CONDITIONS EXPERIENCED BY HELICOPTERS IN COMMERCIAL AND MILITARY OPERATIONS. Marlin E. Hazen. April 1955. 34p. diagrs., photos., 5 tabs. (NACA TN 3434)

A STATISTICAL STUDY OF WING LIFT AT GROUND CONTACT FOR FOUR TRANSPORT AIRPLANES. Dean C. Lindquist. April 1955. 18p. diagrs., tab. (NACA TN 3435)



## Water

### (4.1.2.1.2)

THEORY AND PROCEDURE FOR DETERMINING LOADS AND MOTIONS IN CHINE-IMMERSED HYDRODYNAMIC IMPACTS OF PRISMATIC BODIES. Emanuel Schnitzer. 1953. ii, 29p. diags. (NACA Rept. 1152. Formerly TN 2813)

## GROUND-RUN

### (4.1.2.2)

EXPERIMENTS ON TAIL-WHEEL SHIMMY. (Experimentelle Untersuchungen über das Spornradflattern). O. Dietz and R. Harling. October 1954. 81p. diags., photos. (NACA TM 1376. Trans. from Zentrale für wissenschaftliches Berichtswesen der Luftfahrtforschung, Berlin, FB 1320)

SOME MEASUREMENTS AND POWER SPECTRA OF RUNWAY ROUGHNESS. James H. Walls, John C. Houbolt and Harry Press. November 1954. 27p. diags., tab. (NACA TN 3305)

## Land

### (4.1.2.2.1)

PAPERS ON SHIMMY AND ROLLING BEHAVIOR OF LANDING GEARS PRESENTED AT STUTTGART CONFERENCE OCT. 16 AND 17, 1941. (Bericht über die Sitzung Flattern und Rollverhalten von Fahrwerken am 16./17. Oktober 1941 in Stuttgart). August 1954. ii, 233p. diags., photos., 2 tabs. (NACA TM 1365. Trans. from Lilienthal-Gesellschaft für Luftfahrtforschung, Berlin, Bericht 140)

LOW-SPEED YAWED-ROLLING AND SOME OTHER ELASTIC CHARACTERISTICS OF TWO 56-INCH-DIAMETER, 24-PLY-RATING AIRCRAFT TIRES. Walter B. Horne, Bertrand H. Stephenson and Robert F. Smiley. August 1954. 108p. diags., photos., 6 tabs. (NACA TN 3235)

EXPERIMENTS ON TAIL-WHEEL SHIMMY. (Experimentelle Untersuchungen über das Spornradflattern). O. Dietz and R. Harling. October 1954. 81p. diags., photos. (NACA TM 1376. Trans. from Zentrale für wissenschaftliches Berichtswesen der Luftfahrtforschung, Berlin, FB 1320)

DETERMINATION OF THE ELASTIC CONSTANTS OF AIRPLANE TIRES. (Ermittlung der elastischen Konstanten von Flugzeugreifen). Boeckh. November 1954. 39p. diags. (NACA TM 1378. Trans. from Focke-Wulf Flugzeugbau G.m.b.H., Bremen, V.13.3703)

CONTRIBUTION TO THE THEORY OF TAIL-WHEEL SHIMMY. (Beitrag zur Theorie des Spornradflatterns). M. Melzer. December 1954. 37p. diags., 7 tabs. (NACA TM 1380. Trans. from Focke-Wulf Flugzeugbau G.m.b.H., Bremen, Technische Berichte, v. 7, no. 2, 1940)

## PRELANDING CONDITIONS

### (4.1.2.3)

A STUDY OF NORMAL ACCELERATIONS AND OPERATING CONDITIONS EXPERIENCED BY HELICOPTERS IN COMMERCIAL AND MILITARY OPERATIONS. Marlin E. Hazen. April 1955. 34p. diags., photos., 5 tabs. (NACA TN 3434)

A STATISTICAL STUDY OF WING LIFT AT GROUND CONTACT FOR FOUR TRANSPORT AIRPLANES. Dean C. Lindquist. April 1955. 18p. diags., tab. (NACA TN 3435)

## Vibration and Flutter

### (4.2)

A TORSIONAL STIFFNESS CRITERION FOR PREVENTING FLUTTER OF WINGS OF SUPERSONIC MISSILES. Bernard Budiansky, Joseph N. Kotanchik and Patrick T. Chiarito. August 28, 1947. 14p. diags., tab. (NACA RM L7G02)

NOTE ON FLUTTER OF A 60° DELTA WING ENCOUNTERED AT LOW-SUPERSONIC SPEEDS DURING THE FLIGHT OF A ROCKET-PROPELLED MODEL. William T. Lauten, Jr. and Grady L. Mitcham. May 14, 1951. 21p. diags., photos., 5 tabs. (NACA RM L51B28)

EXPERIMENTAL INVESTIGATION OF THE VIBRATION CHARACTERISTICS OF FOUR DESIGNS OF TURBINE BLADES AND OF THE EFFECT PRODUCED BY VARYING THE AXIAL SPACING BETWEEN NOZZLE BLADES AND TURBINE BLADES. W. C. Morgan and C. R. Morse. February 1952. 28p. diags., photos., tab. (NACA RM E51J25)

AN ANALYSIS OF THE EFFECT OF STRUCTURAL FEEDBACK ON THE FLUTTER OF A CONTROL SURFACE HAVING POWER-BOOST SYSTEM. Robert H. Barnes. June 1952. 29p. diags., photos. (NACA RM A51I25)

AN APPLICATION OF THE ROCKET-PROPELLED-MODEL TECHNIQUE TO THE INVESTIGATION OF LOW-LIFT BUFFETING AND THE RESULTS OF PRELIMINARY TESTS. Homer P. Mason and William N. Gardner. September 1952. 19p. diags., photos. (NACA RM L52C27)

TORSIONAL VIBRATIONS OF HOLLOW THIN-WALLED CYLINDRICAL BEAMS. Edwin T. Kruśzewski and Eldon E. Kordeš. August 1954. 33p. diags., tab. (NACA TN 3206)

EXPERIMENTS ON TAIL-WHEEL SHIMMY. (Experimentelle Untersuchungen über das Spornradflattern). O. Dietz and R. Harling. October 1954. 81p. diags., photos. (NACA TM 1376. Trans. from Zentrale für wissenschaftliches Berichtswesen der Luftfahrtforschung, Berlin, FB 1320)

COMPARISON OF FLUTTER CALCULATIONS USING VARIOUS AERODYNAMIC COEFFICIENTS WITH EXPERIMENTAL RESULTS FOR SOME RECTANGULAR CANTILEVER WINGS AT MACH NUMBER 1.3. Herbert C. Nelson and Ruby A. Rainey. November 1954. 22p. diags., 2 tabs. (NACA TN 3301)

DESCRIPTION AND ANALYSIS OF A ROCKET-VEHICLE EXPERIMENT ON FLUTTER INVOLVING WING DEFORMATION AND BODY MOTIONS. H. J. Cunningham and R. R. Lundstrom. January 1955. 26p. diags., photos., 2 tabs. (NACA TN 3311. Formerly RM L50I29)

METHOD OF CONTROLLING STIFFNESS PROPERTIES OF A SOLID-CONSTRUCTION MODEL WING. Norman S. Land and Frank T. Abbott, Jr. April 1955. 21p. diags., photos., tab. (NACA TN 3423)

## WINGS AND AILERONS

### (4.2.1)

OBSERVATIONS ON AN AILERON-FLUTTER INSTABILITY ENCOUNTERED ON A 45° SWEEPBACK WING IN TRANSONIC AND SUPERSONIC FLIGHT. Marvin Pitkin, William N. Gardner and Howard J. Curfman, Jr. April 11, 1947. 23p. diags., photos. (NACA RM L6L09)

AN INVESTIGATION OF AILERON OSCILLATIONS AT TRANSONIC SPEEDS ON NACA 23012 AND NACA 65-212 AIRFOILS BY THE WING-FLOW METHOD. Harold L. Crane. December 29, 1948. 9p. diags., photo. (NACA RM L8K29)

SOME WIND-TUNNEL EXPERIMENTS ON SINGLE DEGREE OF FREEDOM FLUTTER OF AILERONS IN THE HIGH SUBSONIC SPEED RANGE. Sherman A. Clevenson. March 30, 1949. 33p. diags., photo., 3 tabs. (NACA RM L9B08)

LOW-SPEED TESTS OF A MODEL SIMULATING THE PHENOMENON OF CONTROL-SURFACE BUZZ. William H. Phillips and James J. Adams. August 16, 1950. 16p. diags., photo. (NACA RM L50F19)

INVESTIGATION OF A 42.7° SWEEPBACK WING MODEL TO DETERMINE THE EFFECTS OF TRAILING-EDGE THICKNESS ON THE AILERON HINGE-MOMENT AND FLUTTER CHARACTERISTICS AT TRANSONIC SPEEDS. Robert F. Thompson. December 26, 1950. 42p. diags., photos., 2 tabs. (NACA RM L50J06)

EXPERIMENTAL STUDY OF THE EFFECT OF SWEEPBACK ON TRANSONIC AILERON FLUTTER. Lionel L. Levy, Jr. and Earl D. Knechtel. September 1951. 20p. diags., photo. (NACA RM A51E04)

FLUTTER INVESTIGATION OF TWO THIN, LOW-ASPECT-RATIO, SWEEP, SOLID, METAL WINGS IN THE TRANSONIC RANGE BY USE OF A FREE-FALLING BODY. W. T. Lauten, Jr. and Maurice A. Sylvester. February 1952. 12p. diags., photo., 2 tabs. (NACA RM L51K28a)

PRELIMINARY STUDY OF SOME FACTORS WHICH AFFECT THE STALL-FLUTTER CHARACTERISTICS OF THIN WINGS. A. Gerald Rainey. July 1952. 33p. diags., photo., tab. (NACA RM L52D08)

THE CALCULATION OF CERTAIN STATIC AERO-ELASTIC PHENOMENA OF WINGS WITH TIP TANKS OR BOOM-MOUNTED LIFTING SURFACES. Franklin W. Diederich and Kenneth A. Foss. August 1952. 55p. diags., 2 tabs. (NACA RM L52A22)



### Wings and Ailerons (Cont.)

CONSIDERATIONS ON THE EFFECT OF WIND-TUNNEL WALLS ON OSCILLATING AIR FORCES FOR TWO-DIMENSIONAL SUBSONIC COMPRESSIBLE FLOW. Harry L. Runyan and Charles E. Watkins. 1953. ii, 7p. diags. (NACA Rept. 1150. Formerly TN 2552)

SOME OBSERVATIONS ON STALL FLUTTER AND BUFFETING. A. Gerald Rainey. June 1953. 11p. diags. (NACA RM L53E15)

GENERALIZED INDICIAL FORCES ON DEFORMING RECTANGULAR WINGS IN SUPERSONIC FLIGHT. Harvard Lomax, Franklyn B. Fuller and Loma Sluder. November 1954. 74p. diags., tab. (NACA TN 3286)

INITIAL EXPERIMENTS ON FLUTTER OF UNSWEPT CANTILEVER WINGS AT MACH NUMBER 1.3. W. J. Tuovila, John E. Baker and Arthur A. Regier. November 1954. 19p. diags., photos., 2 tabs. (NACA TN 3312. Formerly RM L8J11)

SOME CONSIDERATIONS ON TWO-DIMENSIONAL THIN AIRFOILS DEFORMING IN SUPERSONIC FLOW. Eugene Migotsky. January 1955. 36p. diags. (NACA TN 3386)

TOTAL LIFT AND PITCHING MOMENT ON THIN ARROWHEAD WINGS OSCILLATING IN SUPERSONIC POTENTIAL FLOW. H. J. Cunningham. May 1955. 43p. diags., 4 tabs. (NACA TN 3433)

ON THE KERNEL FUNCTION OF THE INTEGRAL EQUATION RELATING LIFT AND DOWNWASH DISTRIBUTIONS OF OSCILLATING WINGS IN SUPERSONIC FLOW. Charles E. Watkins and Julian H. Berman. May 1955. 43p. (NACA TN 3438)

## TAILS (4.2.2)

### ELEVATORS AND RUDDERS (4.2.2.1)

AN ANALYSIS OF THE EFFECT OF STRUCTURAL FEEDBACK ON THE FLUTTER OF A CONTROL SURFACE HAVING POWER-BOOST SYSTEM. Robert H. Barnes. June 1952. 29p. diags., photos. (NACA RM A51125)

## BODIES (4.2.3)

AN EXPLORATORY INVESTIGATION OF SOME TYPES OF AEROELASTIC INSTABILITY OF OPEN AND CLOSED BODIES OF REVOLUTION MOUNTED ON SLENDER STRUTS. S. A. Clevenson, E. Widmayer, Jr. and Franklin W. Diederich. November 1954. 44p. diags., photos., 3 tabs. (NACA TN 3308. Formerly RM L53E07)

EFFECTIVE MOMENT OF INERTIA OF FLUID IN OFFSET, INCLINED, AND SWEPT-WING TANKS UNDERGOING PITCHING OSCILLATIONS. James R. Reese and John L. Sewall. January 1955. 27p. diags., 6 tabs. (NACA TN 3353)

## PROPELLER, FANS, AND COMPRESSORS (4.2.4)

AN INVESTIGATION OF PROPELLER VIBRATIONS EXCITED BY WING WAKES. W. H. Gray and William Solomon. January 1952. 31p. diags., photo., tab. (NACA RM L51G13)

PRELIMINARY STUDY OF SOME FACTORS WHICH AFFECT THE STALL-FLUTTER CHARACTERISTICS OF THIN WINGS. A. Gerald Rainey. July 1952. 33p. diags., photo., tab. (NACA RM L52D08)

SOME TORSIONAL-DAMPING MEASUREMENTS OF LAMINATED BEAMS AS APPLIED TO THE PROPELLER STALL-FLUTTER PROBLEM. Atwood R. Heath, Jr. April 1953. 14p. diags., photos., tab. (NACA RM L53A19)

LIFT AND MOMENT EQUATIONS FOR OSCILLATING AIRFOILS IN AN INFINITE UNSTAGGERED CASCADE. Alexander Mendelson and Robert W. Carroll. October 1954. 46p. diags., 3 tabs. (NACA TN 3263)

THE EFFECTS OF VARIOUS PARAMETERS, INCLUDING MACH NUMBER, ON PROPELLER-BLADE FLUTTER WITH EMPHASIS ON STALL FLUTTER. John E. Baker. January 1955. 40p. diags., 3 tabs. (NACA TN 3357. Formerly RM L50L12b)

ON THE CALCULATION OF THE 1: P OSCILLATING AERODYNAMIC LOADS ON SINGLE-ROTATION PROPELLERS IN PITCH ON TRACTOR AIRPLANES. Vernon L. Rogallo and Paul F. Yaggy. May 1955. 28p. diags., photo. (NACA TN 3395)

## ROTATING-WING AIRCRAFT (4.2.5)

DESCRIPTION AND INVESTIGATION OF A DYNAMIC MODEL OF THE XH-17 TWO-BLADE JET-DRIVEN HELICOPTER. George W. Brooks and Maurice A. Sylvester. March 14, 1951. 49p. diags., photos., 6 tabs. (NACA RM L50I21)

Rotating-Wing Aircraft (Cont.)

RAPID ESTIMATION OF BENDING FREQUENCIES  
OF ROTATING BEAMS. Robert T. Yntema.  
August 1954. 18p. diagrs., tab. (NACA RM L54G02)

REVIEW OF INFORMATION ON INDUCED FLOW OF  
A LIFTING ROTOR. Alfred Gessow. August 1954.  
16p. diagrs., photo., tab. (NACA TN 3238)

THE EFFECT OF CONTROL STIFFNESS AND FORWARD SPEED ON THE FLUTTER OF A 1/10-SCALE DYNAMIC MODEL OF A TWO-BLADE JET-DRIVEN HELICOPTER ROTOR. George W. Brooks and Maurice A. Sylvester. April 1955. 38p. diagrs., photo., 3 tabs. (NACA TN 3376)

A DYNAMIC-MODEL STUDY OF THE EFFECT OF ADDED WEIGHTS AND OTHER STRUCTURAL VARIATIONS ON THE BLADE BENDING STRAINS OF AN EXPERIMENTAL TWO-BLADE JET-DRIVEN HELICOPTER IN HOVERING AND FORWARD FLIGHT. John Locke McCarty and George W. Brooks. May 1955. i, 47p. diagrs., photo., 6 tabs. (NACA TN 3367)



## Structures

## (4.3)

## COLUMNS

## (4.3.1)

AN INVESTIGATION OF THE CREEP LIFETIME OF 75S-T6 ALUMINUM-ALLOY COLUMNS. Eldon E. Mathauser and William A. Brooks, Jr. July 1954. 28p. diags., photos., tab. (NACA TN 3204)

## FRAMES, GRIDWORKS, AND TRUSSES

## (4.3.2)

BENDING TESTS ON BOX BEAMS HAVING SOLID- AND OPEN-CONSTRUCTION WEBS. Aldie E. Johnson, Jr. August 1954. 25p. diags., photos., 2 tabs. (NACA TN 3231)

## PLATES

## (4.3.3)

## FLAT

## (4.3.3.1)

METHOD OF CONTROLLING STIFFNESS PROPERTIES OF A SOLID-CONSTRUCTION MODEL WING. Norman S. Land and Frank T. Abbott, Jr. April 1955. 21p. diags., photos., tab. (NACA TN 3423)

Unstiffened

## (4.3.3.1.1)

ANALYSIS OF BEHAVIOR OF SIMPLY SUPPORTED FLAT PLATES COMPRESSED BEYOND THE BUCKLING LOAD INTO THE PLASTIC RANGE. J. Mayers and Bernard Budiansky. February 1955. 44p. diags. (NACA TN 3368)

Stiffened

## (4.3.3.1.2)

TESTS OF BONDED AND RIVETED SHEET-STRINGER PANELS. Leonard Mordfin and I. E. Wilks, National Bureau of Standards. June 1954. 45p. diags., photos., 5 tabs. (NACA TN 3215)

BENDING TESTS ON BOX BEAMS HAVING SOLID- AND OPEN-CONSTRUCTION WEBS. Aldie E. Johnson, Jr. August 1954. 25p. diags., photos., 2 tabs. (NACA TN 3231)

AN ANALYSIS OF THE STABILITY AND ULTIMATE BENDING STRENGTH OF MULTIWEB BEAMS WITH FORMED-CHANNEL WEBS. Joseph W. Semonian and Roger A. Anderson. August 1954. 28p. diags., photos. (NACA TN 3232)

AN ANALYSIS OF THE STABILITY AND ULTIMATE COMPRESSIVE STRENGTH OF SHORT SHEET-STRINGER PANELS WITH SPECIAL REFERENCE TO THE INFLUENCE OF RIVETED CONNECTION BETWEEN SHEET AND STRINGER. Joseph W. Semonian and James P. Peterson. March 1955. 49p. diags., tab. (NACA TN 3431)

## CURVED

## (4.3.3.2)

Unstiffened

## (4.3.3.2.1)

A NONLINEAR THEORY OF BENDING AND BUCKLING OF THIN ELASTIC SHALLOW SPHERICAL SHELLS. A. Kaplan and Y. C. Fung, California Institute of Technology. August 1954. 58p. diags., photo., 5 tabs. (NACA TN 3212)

## BEAMS

## (4.3.4)

ON TRAVELING WAVES IN BEAMS. Robert W. Leonard and Bernard Budiansky. 1954. iii, 27p. diags. (NACA Rept. 1173. Formerly TN 2874)

RAPID ESTIMATION OF BENDING FREQUENCIES OF ROTATING BEAMS. Robert T. Yntema. August 1954. 18p. diags., tab. (NACA RM L54G02)

TORSIONAL VIBRATIONS OF HOLLOW THIN-WALLED CYLINDRICAL BEAMS. Edwin T. Kruszewski and Eldon E. Kordes. August 1954. 33p. diags., tab. (NACA TN 3206)

STRESS DISTRIBUTIONS CAUSED BY THREE TYPES OF LOADING ON A CIRCULAR SEMIMONOCOQUE CYLINDER WITH FLEXIBLE RINGS. Harvey G. McComb, Jr. September 1954. 54p. diags. (NACA TN 3199)

**BOX**  
**(4. 3. 4. 1)**

BENDING TESTS ON BOX BEAMS HAVING SOLID- AND OPEN-CONSTRUCTION WEBS. Aldie E. Johnson, Jr. August 1954. 25p. diagrs., photos., 2 tabs. (NACA TN 3231)

AN ANALYSIS OF THE STABILITY AND ULTIMATE BENDING STRENGTH OF MULTIWEB BEAMS WITH FORMED-CHANNEL WEBS. Joseph W. Semonian and Roger A. Anderson. August 1954. 28p. diagrs., photos. (NACA TN 3232)

INVESTIGATION OF STATIC STRENGTH AND CREEP BEHAVIOR OF AN ALUMINUM-ALLOY MULTIWEB BOX BEAM AT ELEVATED TEMPERATURES. Eldon E. Mathauser. November 1954. 21p. diagrs., photos., 4 tabs. (NACA TN 3310)

**SHELLS**  
**(4. 3. 5)**

A NONLINEAR THEORY OF BENDING AND BUCKLING OF THIN ELASTIC SHALLOW SPHERICAL SHELLS. A. Kaplan and Y. C. Fung, California Institute of Technology. August 1954. 58p. diagrs., photo., 5 tabs. (NACA TN 3212)

ELECTRICAL ANALOGIES FOR STIFFENED SHELLS WITH FLEXIBLE RINGS. R. H. MacNeal, California Institute of Technology. December 1954. 35p. diagrs., 2 tabs. (NACA TN 3280)

**CYLINDERS**  
**(4. 3. 5. 1)**

TORSIONAL VIBRATIONS OF HOLLOW THIN-WALLED CYLINDRICAL BEAMS. Edwin T. Kruszewski and Eldon E. Kordes. August 1954. 33p. diagrs., tab. (NACA TN 3206)

**Circular**  
**(4. 3. 5. 1. 1)**

EXPERIMENTAL STRESS ANALYSIS OF STIFFENED CYLINDERS WITH CUTOUTS. SHEAR LOAD. Floyd R. Schlechte and Richard Rosecrans. July 1954. 87p. diagrs., photo., 13 tabs. (NACA TN 3192)

STRESS DISTRIBUTIONS CAUSED BY THREE TYPES OF LOADING ON A CIRCULAR SEMIMONOCOQUE CYLINDER WITH FLEXIBLE RINGS. Harvey G. McComb, Jr. September 1954. 54p. diagrs. (NACA TN 3199)

STRESS ANALYSIS OF CIRCULAR SEMIMONOCOQUE CYLINDERS WITH CUTOUTS BY A PERTURBATION LOAD TECHNIQUE. Harvey G. McComb, Jr. September 1954. 37p. diagrs., 3 tabs. (NACA TN 3200)

PRELIMINARY INVESTIGATION OF THE FAILURE OF PRESSURIZED STIFFENED CYLINDERS. Norris F. Dow and Roger W. Peters. May 1955. 14p. diagrs., photos., tab. (NACA RM L55D15b)

**CONNECTIONS**  
**(4. 3. 6)**

EFFECT OF PRESSURE ON THERMAL CONDUCTANCE OF CONTACT JOINTS. Martin E. Barzelay, Kin Nee Tong and George F. Holloway, Syracuse University. May 1955. 52p. diagrs., 2 tabs. (NACA TN 3295)

PRELIMINARY INVESTIGATION OF PROPERTIES OF HIGH-TEMPERATURE BRAZED JOINTS PROCESSED IN VACUUM OR IN MOLTEN SALT. C. A. Gyorgak and A. C. Francisco. May 1955. 29p. diagrs., photos., 7 tabs. (NACA TN 3450)

**BOLTED**  
**(4. 3. 6. 1)**

ADDITIONAL STATIC AND FATIGUE TESTS OF HIGH-STRENGTH ALUMINUM-ALLOY BOLTED JOINTS. E. C. Hartmann, Marshall Holt and I. D. Eaton, Aluminum Company of America. July 1954. 42p. diagrs., photos., 7 tabs. (NACA TN 3269)

**RIVETED**  
**(4. 3. 6. 2)**

AN ANALYSIS OF THE STABILITY AND ULTIMATE COMPRESSIVE STRENGTH OF SHORT SHEET-STRINGER PANELS WITH SPECIAL REFERENCE TO THE INFLUENCE OF RIVETED CONNECTION BETWEEN SHEET AND STRINGER. Joseph W. Semonian and James P. Peterson. March 1955. 49p. diagrs., tab. (NACA TN 3431)

**LOADS AND STRESSES**  
**(4. 3. 7)**

EXPERIMENTAL STRESS ANALYSIS OF STIFFENED CYLINDERS WITH CUTOUTS. SHEAR LOAD. Floyd R. Schlechte and Richard Rosecrans. July 1954. 87p. diagrs., photo., 13 tabs. (NACA TN 3192)



Loads and Stresses (Cont.)

STRESS DISTRIBUTIONS CAUSED BY THREE TYPES OF LOADING ON A CIRCULAR SEMIMONOCOQUE CYLINDER WITH FLEXIBLE RINGS. Harvey G. McComb, Jr. September 1954. 54p. diagsr. (NACA TN 3199)

STRESS ANALYSIS OF CIRCULAR SEMIMONOCOQUE CYLINDERS WITH CUTOUTS BY A PERTURBATION LOAD TECHNIQUE. Harvey G. McComb, Jr. September 1954. 37p. diagsr., 3 tabs. (NACA TN 3200)

COMPRESSION  
(4.3.7.2)

TESTS OF BONDED AND RIVETED SHEET-STRINGER PANELS. Leonard Mordfin and I. E. Wilks, National Bureau of Standards. June 1954. 45p. diagsr., photos., 5 tabs. (NACA TN 3215)

AN ANALYSIS OF THE STABILITY AND ULTIMATE BENDING STRENGTH OF MULTIWEB BEAMS WITH FORMED-CHANNEL WEBS. Joseph W. Semonian and Roger A. Anderson. August 1954. 28p. diagsr., photos. (NACA TN 3232)

ANALYSIS OF BEHAVIOR OF SIMPLY SUPPORTED FLAT PLATES COMPRESSED BEYOND THE BUCKLING LOAD INTO THE PLASTIC RANGE. J. Mayers and Bernard Budiansky. February 1955. 44p. diagsr. (NACA TN 3368)

AN ANALYSIS OF THE STABILITY AND ULTIMATE COMPRESSIVE STRENGTH OF SHORT SHEET-STRINGER PANELS WITH SPECIAL REFERENCE TO THE INFLUENCE OF RIVETED CONNECTION BETWEEN SHEET AND STRINGER. Joseph W. Semonian and James P. Peterson. March 1955. 49p. diagsr., tab. (NACA TN 3431)

BENDING  
(4.3.7.3)

BENDING TESTS ON BOX BEAMS HAVING SOLID- AND OPEN-CONSTRUCTION WEBS. Aldie E. Johnson, Jr. August 1954. 25p. diagsr., photos., 2 tabs. (NACA TN 3231)

AN ANALYSIS OF THE STABILITY AND ULTIMATE BENDING STRENGTH OF MULTIWEB BEAMS WITH FORMED-CHANNEL WEBS. Joseph W. Semonian and Roger A. Anderson. August 1954. 28p. diagsr., photos. (NACA TN 3232)

TORSION  
(4.3.7.4)

A TORSIONAL STIFFNESS CRITERION FOR PREVENTING FLUTTER OF WINGS OF SUPERSONIC MISSILES. Bernard Budiansky, Joseph N. Kotanchik and Patrick T. Chiarito. August 28, 1947. 14p. diagsr., tab. (NACA RM L7G02)

SHEAR  
(4.3.7.5)

EXPERIMENTAL STRESS ANALYSIS OF STIFFENED CYLINDERS WITH CUTOUTS. SHEAR LOAD. Floyd R. Schlechte and Richard Rosecrans. July 1954. 87p. diagsr., photo., 13 tabs. (NACA TN 3192)

CONCENTRATED  
(4.3.7.6)

SOME OBSERVATIONS ON LOSS OF STATIC STRENGTH DUE TO FATIGUE CRACKS. Walter Illg and Herbert F. Hardrath. May 1955. 8p. diagsr. (NACA RM L55D15a)

DYNAMIC  
(4.3.7.7)

A STUDY OF THE APPLICATION OF POWER-SPECTRAL METHODS OF GENERALIZED HARMONIC ANALYSIS TO GUST LOADS ON AIRPLANES. Harry Press and Bernard Mazelsky. 1954. ii, 17p. diagsr., 2 tabs. (NACA Rept. 1172. Formerly TN 2853)

AN INVESTIGATION OF THE USE OF ROCKET-POWERED MODELS FOR GUST-LOAD STUDIES WITH AN APPLICATION TO A TAILLESS SWEEP-WING MODEL AT TRANSONIC SPEEDS. A. James Vitale, H. Press and C. C. Shufflebarger. June 1954. 36p. diagsr., photos., tab. (NACA TN 3161)

RAPID ESTIMATION OF BENDING FREQUENCIES OF ROTATING BEAMS. Robert T. Yntema. August 1954. 18p. diagsr., tab. (NACA RM L54G02)

TORSIONAL VIBRATIONS OF HOLLOW THIN-WALLED CYLINDRICAL BEAMS. Edwin T. Kruszewski and Eldon E. Kordes. August 1954. 33p. diagsr., tab. (NACA TN 3206)

AN EXPERIMENTAL INVESTIGATION OF WHEEL SPIN-UP DRAG LOADS. Benjamin Milwitzky, Dean C. Lindquist and Dexter M. Potter. September 1954. 18p. diagsr. (NACA TN 3246. Formerly RM L53E06b)

Repeated  
(4.3.7.7.1)

ADDITIONAL STATIC AND FATIGUE TESTS OF HIGH-STRENGTH ALUMINUM-ALLOY BOLTED JOINTS. E. C. Hartmann, Marshall Holt and I. D. Eaton, Aluminum Company of America. July 1954. 42p. diagsr., photos., 7 tabs. (NACA TN 3269)

ESTIMATES OF PROBABILITY DISTRIBUTION OF ROOT-MEAN-SQUARE GUST VELOCITY OF ATMOSPHERIC TURBULENCE FROM OPERATIONAL GUST-LOAD DATA BY RANDOM-PROCESS THEORY. Harry Press, May T. Meadows and Ivan Hadlock. March 1955. 48p. diagsr., 4 tabs. (NACA TN 3362)

Repeated - Dynamic (Cont.)

PRELIMINARY INVESTIGATION OF THE FAILURE OF PRESSURIZED STIFFENED CYLINDERS. Norris F. Dow and Roger W. Peters. May 1955. 14p. diags., photos., tab. (NACA RM L55D15b)

A DYNAMIC-MODEL STUDY OF THE EFFECT OF ADDED WEIGHTS AND OTHER STRUCTURAL VARIATIONS ON THE BLADE BENDING STRAINS OF AN EXPERIMENTAL TWO-BLADE JET-DRIVEN HELICOPTER IN HOVERING AND FORWARD FLIGHT. John Locke McCarty and George W. Brooks. May 1955. i, 47p. diags., photo., 6 tabs. (NACA TN 3367)

Transient  
(4.3.7.7.2)

ANALYSIS OF LANDING-GEAR BEHAVIOR. Benjamin Milwitzky and Francis E. Cook. 1953. iii, 45p. diags., photo., 3 tabs. (NACA Rept. 1154. Formerly TN 2755)

ON TRAVELING WAVES IN BEAMS. Robert W. Leonard and Bernard Budiansky. 1954. iii, 27p. diags. (NACA Rept. 1173. Formerly TN 2874)

NORMAL PRESSURES  
(4.3.7.8)

A NONLINEAR THEORY OF BENDING AND BUCKLING OF THIN ELASTIC SHALLOW SPHERICAL SHELLS. A. Kaplan and Y. C. Fung, California Institute of Technology. August 1954. 58p. diags., photo., 5 tabs. (NACA TN 3212)



**MATERIALS**

**(5)**

**(5)**

## Types (5.1)

EXPERIMENTAL INVESTIGATION OF AIR-FLOW UNIFORMITY AND PRESSURE LEVEL ON WIRE CLOTH FOR TRANSPIRATION-COOLING APPLICATIONS. Patrick L. Donoughe and Roy A. McKinnon. July 1952. 28p. diagrs., photos., tab. (NACA RM E52E16)

### ALUMINUM (5.1.1)

TIME-TEMPERATURE PARAMETERS AND AN APPLICATION TO RUPTURE AND CREEP OF ALUMINUM ALLOYS. George J. Heimerl. June 1954. 35p. diagrs., tab. (NACA TN 3195)

ADDITIONAL STATIC AND FATIGUE TESTS OF HIGH-STRENGTH ALUMINUM-ALLOY BOLTED JOINTS. E. C. Hartmann, Marshall Holt and I. D. Eaton, Aluminum Company of America. July 1954. 42p. diagrs., photos., 7 tabs. (NACA TN 3269)

AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THE ANISOTROPY OF 3S ALUMINUM-ALLOY SHEET IN THE PLASTIC RANGE. Arthur J. McEvily, Jr. and Philip J. Hughes. October 1954. 45p. diagrs., photos., 4 tabs. (NACA TN 3248)

EXPERIMENTAL INVESTIGATION OF NOTCH-SIZE EFFECTS ON ROTATING-BEAM FATIGUE BEHAVIOR OF 75S-T6 ALUMINUM ALLOY. W. S. Hyler, R. A. Lewis and H. J. Grover, Battelle Memorial Institute. November 1954. 47p. diagrs., photos., 12 tabs. (NACA TN 3291)

INFLUENCE OF EXPOSED AREA ON STRESS-CORROSION CRACKING OF 24S ALUMINUM ALLOY. William H. Colner and Howard T. Francis, Armour Research Foundation. November 1954. 22p. diagrs., photos., tab. (NACA TN 3292)

INTERGRANULAR CORROSION OF HIGH-PURITY ALUMINUM IN HYDROCHLORIC ACID. I - EFFECTS OF HEAT TREATMENT, IRON CONTENT, AND ACID COMPOSITION. M. Metzger and J. Intrater, Columbia University. February 1955. 38p. photos., 8 tabs. (NACA TN 3281)

STUDY OF EFFECTS OF MICROSTRUCTURE AND ANISOTROPY ON FATIGUE OF 24S-T4 ALUMINUM ALLOY. H. A. Lipsitt, G. E. Dieter, G. T. Horne and R. F. Mehl, Carnegie Institute of Technology. March 1955. 41p. diagrs., photos., 4 tabs. (NACA TN 3380)

AN ANALYSIS OF THE STABILITY AND ULTIMATE COMPRESSIVE STRENGTH OF SHORT SHEET-STRINGER PANELS WITH SPECIAL REFERENCE TO THE INFLUENCE OF RIVETED CONNECTION BETWEEN SHEET AND STRINGER. Joseph W. Semonian and James P. Peterson. March 1955. 49p. diagrs., tab. (NACA TN 3431)

INTERGRANULAR CORROSION OF HIGH-PURITY ALUMINUM IN HYDROCHLORIC ACID. II - GRAIN-BOUNDARY SEGREGATION OF IMPURITY ATOMS. M. Metzger and J. Intrater, Columbia University. April 1955. 33p. diagrs., 4 tabs. (NACA TN 3282)

PLASTIC DEFORMATION OF ALUMINUM SINGLE CRYSTALS AT ELEVATED TEMPERATURES. R. D. Johnson, A. P. Young and A. D. Schwoppe, Battelle Memorial Institute. April 1955. 76p. diagrs., photos., 3 tabs. (NACA TN 3351)

SOME OBSERVATIONS ON LOSS OF STATIC STRENGTH DUE TO FATIGUE CRACKS. Walter Illg and Herbert F. Hardrath. May 1955. 8p. diagrs. (NACA RM L55D15a)

PRELIMINARY INVESTIGATION OF THE FAILURE OF PRESSURIZED STIFFENED CYLINDERS. Norris F. Dow and Roger W. Peters. May 1955. 14p. diagrs., photos., tab. (NACA RM L55D15b)

ANALYSIS OF EAR FORMATION IN DEEP-DRAWN CUPS. Arthur J. McEvily, Jr. May 1955. 7p. diagrs. (NACA TN 3439)

### STEELS (5.1.3)

TIME-TEMPERATURE PARAMETERS AND AN APPLICATION TO RUPTURE AND CREEP OF ALUMINUM ALLOYS. George J. Heimerl. June 1954. 35p. diagrs., tab. (NACA TN 3195)

HIGH-RESOLUTION AUTORADIOGRAPHY. George C. Towe, Henry J. Gomborg and J. W. Freeman, University of Michigan. July 1954. ii, 138p. diagrs., photos., 9 tabs. (NACA TN 3209)

TENSILE AND COMPRESSIVE STRESS-STRAIN PROPERTIES OF SOME HIGH-STRENGTH SHEET ALLOYS AT ELEVATED TEMPERATURES. Philip J. Hughes, John E. Inge and Stanley B. Prosser. November 1954. 32p. diagrs., photos., 6 tabs. (NACA TN 3315)

### HEAT-RESISTING ALLOYS (5.1.4)

FABRICATION AND PROPERTIES OF HOT-PRESSED MOLYBDENUM DISILICIDE. Roger A. Long. August 24, 1950. 34p. diagrs., photos., tab. (NACA RM E50F22)

INVESTIGATION OF MECHANISMS OF BLADE FAILURE OF FORGED HASTELLOY B AND CAST STELLITE 21 TURBINE BLADES IN TURBOJET ENGINE. C. Yaker, C. F. Robards and F. B. Garrett. August 1951. 41p. diagrs., photos., 2 tabs. (NACA RM E51D16)

SOME FACTORS AFFECTING FABRICATION AND HIGH-TEMPERATURE STRENGTH OF MOLYBDENUM DISILICIDE. W. A. Maxwell. April 1952. 25p. diagrs., photos., 3 tabs. (NACA RM E52B06)

PRELIMINARY INVESTIGATION OF THE HEAT-SHOCK RESISTANT PROPERTIES OF MOLYBDENUM DISILICIDE BLADES UNDER CENTRIFUGAL LOAD. Roger A. Long and John C. Freche. May 1952. 15p. diagrs., photos., tab. (NACA RM E52A17)



## Heat-Resisting Alloys (Cont.)

SOME STRESS-RUPTURE AND CREEP PROPERTIES OF MOLYBDENUM DISILICIDE IN THE RANGE 1600° TO 2000° F. W. A. Maxwell. June 1952. 19p. diags., photos., 2 tabs. (NACA RM E52D09)

INVESTIGATION OF ENGINE PERFORMANCE AND HIGH-TEMPERATURE PROPERTIES OF PRECISION-CAST TURBINE BLADES OF HIGH-CARBON STELLITE 21 AND CONTROLLED-GRAIN-SIZE STELLITE 21. Charles Yaker, Floyd B. Garrett and Paul F. Sikora. June 1952. 38p. diags., photos., 6 tabs. (NACA RM E52D10)

SURVEY OF PORTIONS OF THE CHROMIUM-COBALT-NICKEL-MOLYBDENUM QUATERNARY SYSTEM AT 1200° C. Sheldon Paul Rideout and Paul A. Beck, University of Notre Dame. 1953. ii, 38p. diags., photos., 20 tabs. (NACA Rept. 1122. Formerly TN 2683)

BEHAVIOR OF FORGED S-816 TURBINE BLADES IN STEADY-STATE OPERATION OF J33-9 TURBOJET ENGINE WITH STRESS-RUPTURE AND METALLOGRAPHIC EVALUATIONS. F. B. Garrett, C. A. Gyorgak and J. W. Weeton. February 1953. 29p. diags., photos., 3 tabs. (NACA RM E52L17)

ADHESIVE AND PROTECTIVE CHARACTERISTICS OF CERAMIC COATING A-417 AND ITS EFFECT ON ENGINE LIFE OF FORGED REFRACTALLOY-26 (AMS 5760) AND CAST STELLITE 21 (AMS 5385) TURBINE BLADES. Floyd B. Garrett and Charles A. Gyorgak. February 1953. 21p. photos., diagr., 4 tabs. (NACA RM E52L30)

BEHAVIOR OF MATERIALS UNDER CONDITIONS OF THERMAL STRESS. S. S. Manson. 1954. ii, 34p. diags., photos., 6 tabs. (NACA Rept. 1170. Formerly TN 2933)

HIGH-RESOLUTION AUTORADIOGRAPHY. George C. Towe, Henry J. Gomberg and J. W. Freeman, University of Michigan. July 1954. ii, 138p. diags., photos., 9 tabs. (NACA TN 3209)

PRELIMINARY INVESTIGATION OF STRESS-RUPTURE AND TENSILE STRENGTH OF THERMENOL, AN IRON-ALUMINUM ALLOY. Charles A. Gyorgak. August 1954. 11p. diags., 3 tabs. (NACA RM E54F10)

INVESTIGATION OF NICKEL-ALUMINUM ALLOYS CONTAINING FROM 14 TO 34 PERCENT ALUMINUM. W. A. Maxwell and E. M. Grala. August 1954. 42p. diags., photos., 7 tabs. (NACA TN 3259)

A DROP TEST FOR THE EVALUATION OF THE IMPACT STRENGTH OF CERMETS. B. Pinkel, G. C. Deutsch and N. H. Katz. March 1955. 8p. diags., photo. (NACA RM E54D13)

COOPERATIVE INVESTIGATION OF RELATIONSHIP BETWEEN STATIC AND FATIGUE PROPERTIES OF WROUGHT N-155 ALLOY AT ELEVATED TEMPERATURES. NACA Subcommittee on Heat-Resisting Materials. April 1955. 92p. diags., photos., 13 tabs. (NACA TN 3216)

## CERAMICS (5.1.5)

FABRICATION AND PROPERTIES OF HOT-PRESSED MOLYBDENUM DISILICIDE. Roger A. Long. August 24, 1950. 34p. diags., photos., tab. (NACA RM E50F22)

SOME FACTORS AFFECTING FABRICATION AND HIGH-TEMPERATURE STRENGTH OF MOLYBDENUM DISILICIDE. W. A. Maxwell. April 1952. 25p. diags., photos., 3 tabs. (NACA RM E52B06)

PRELIMINARY INVESTIGATION OF THE HEAT-SHOCK RESISTANT PROPERTIES OF MOLYBDENUM DISILICIDE BLADES UNDER CENTRIFUGAL LOAD. Roger A. Long and John C. Freche. May 1952. 15p. diags., photos., tab. (NACA RM E52A17)

SOME STRESS-RUPTURE AND CREEP PROPERTIES OF MOLYBDENUM DISILICIDE IN THE RANGE 1600° TO 2000° F. W. A. Maxwell. June 1952. 19p. diags., photos., 2 tabs. (NACA RM E52D09)

ADHESIVE AND PROTECTIVE CHARACTERISTICS OF CERAMIC COATING A-417 AND ITS EFFECT ON ENGINE LIFE OF FORGED REFRACTALLOY-26 (AMS 5760) AND CAST STELLITE 21 (AMS 5385) TURBINE BLADES. Floyd B. Garrett and Charles A. Gyorgak. February 1953. 21p. photos., diagr., 4 tabs. (NACA RM E52L30)

COMPARISON OF THEORETICALLY AND EXPERIMENTALLY DETERMINED EFFECTS OF OXIDE COATINGS SUPPLIED BY FUEL ADDITIVES ON UNCOOLED TURBINE-BLADE TEMPERATURE DURING TRANSIENT TURBOJET-ENGINE OPERATION. Louis J. Schafer, Jr., Francis S. Stepka and W. Byron Brown. March 1953. 45p. photos., diags., tab. (NACA RM E53A19)

RELATION BETWEEN ROUGHNESS OF INTERFACE AND ADHERENCE OF PORCELAIN ENAMEL TO STEEL. J. C. Richmond, D. G. Moore, H. B. Kirkpatrick and W. N. Harrison, National Bureau of Standards. 1954. ii, 9p. diags., photos., 7 tabs. (NACA Rept. 1166. Formerly TN 2934)

BEHAVIOR OF MATERIALS UNDER CONDITIONS OF THERMAL STRESS. S. S. Manson. 1954. ii, 34p. diags., photos., 6 tabs. (NACA Rept. 1170. Formerly TN 2933)

ROLE OF NICKEL DIP IN ENAMELING OF SHEET STEEL. D. G. Moore, J. W. Pitts and W. N. Harrison, National Bureau of Standards. June 1954. 27p. diags., photos., 8 tabs. (NACA TN 3207)

A DROP TEST FOR THE EVALUATION OF THE IMPACT STRENGTH OF CERMETS. B. Pinkel, G. C. Deutsch and N. H. Katz. March 1955. 8p. diags., photo. (NACA RM E54D13)

MEASURED EFFECTIVE THERMAL CONDUCTIVITY OF URANIUM OXIDE POWDER IN VARIOUS GASES AND GAS MIXTURES. J. S. Boegli and R. G. Deissler. March 1955. 20p. diags., tab. (NACA RM E54L10)

## PLASTICS (5.1.6)

EFFECTS OF MULTIAXIAL STRETCHING ON CRAZING AND OTHER PROPERTIES OF TRANSPARENT PLASTICS. Irvin Wolock and Desmond A. George, National Bureau of Standards. October 1954. 34p. diags., photos., 10 tabs. (NACA RM 54F22)

## WOODS (5.1.7)

DESCRIPTION AND INVESTIGATION OF A DYNAMIC MODEL OF THE XH-17 TWO-BLADE JET-DRIVEN HELICOPTER. George W. Brooks and Maurice A. Sylvester. March 14, 1951. 49p. diags., photos., 6 tabs. (NACA RM L50I21)

## ADHESIVES (5.1.8)

SOME TORSIONAL-DAMPING MEASUREMENTS OF LAMINATED BEAMS AS APPLIED TO THE PROPELLER STALL-FLUTTER PROBLEM. Atwood R. Heath, Jr. April 1953. 14p. diags., photos., tab. (NACA RM L53A19)

## PROTECTIVE COATINGS (5.1.9)

ADHESIVE AND PROTECTIVE CHARACTERISTICS OF CERAMIC COATING A-417 AND ITS EFFECT ON ENGINE LIFE OF FORGED REFRACTALLOY-26 (AMS 5760) AND CAST STELLITE 21 (AMS 5385) TURBINE BLADES. Floyd B. Garrett and Charles A. Gyorgak. February 1953. 21p. photos., diagr., 4 tabs. (NACA RM E52L30)

COMPARISON OF THEORETICALLY AND EXPERIMENTALLY DETERMINED EFFECTS OF OXIDE COATINGS SUPPLIED BY FUEL ADDITIVES ON UNCOOLED TURBINE-BLADE TEMPERATURE DURING TRANSIENT TURBOJET-ENGINE OPERATION. Louis J. Schafer, Jr., Francis S. Stepka and W. Byron Brown. March 1953. 45p. photos., diags., tab. (NACA RM E53A19)

RELATION BETWEEN ROUGHNESS OF INTERFACE AND ADHERENCE OF PORCELAIN ENAMEL TO STEEL. J. C. Richmond, D. G. Moore, H. B. Kirkpatrick and W. N. Harrison, National Bureau of Standards. 1954. ii, 9p. diags., photos., 7 tabs. (NACA Rept. 1166. Formerly TN 2934)

ROLE OF NICKEL DIP IN ENAMELING OF SHEET STEEL. D. G. Moore, J. W. Pitts and W. N. Harrison, National Bureau of Standards. June 1954. 27p. diags., photos., 8 tabs. (NACA TN 3207)

EFFECT OF OXYGEN CONTENT OF FURNACE ATMOSPHERE ON ADHERENCE OF VITREOUS COATINGS TO IRON. A. G. Eubanks and D. G. Moore, National Bureau of Standards. May 1955. 17p. diags., photos., 2 tabs. (NACA TN 3297)

## SANDWICH & LAMINATES (5.1.11)

SOME TORSIONAL-DAMPING MEASUREMENTS OF LAMINATED BEAMS AS APPLIED TO THE PROPELLER STALL-FLUTTER PROBLEM. Atwood R. Heath, Jr. April 1953. 14p. diags., photos., tab. (NACA RM L53A19)

EFFECTS OF RESIN COATING METHODS AND OTHER VARIABLES ON PHYSICAL PROPERTIES OF GLASS-FABRIC REINFORCED POLYESTERS. B. M. Axilrod, J. E. Wier and J. Mandel, National Bureau of Standards. August 1954. 22p., 6 tabs. (NACA RM 54G26)

## CERAMALS (5.1.12)

THE DESIGN OF BRITTLE-MATERIAL BLADE ROOTS BASED ON THEORY AND RUPTURE TESTS OF PLASTIC MODELS. Andre J. Meyer, Jr., Albert Kaufman and William C. Caywood. April 6, 1953. 45p. diags., photos., tab. (NACA RM E53C12)

BEHAVIOR OF MATERIALS UNDER CONDITIONS OF THERMAL STRESS. S. S. Manson. 1954. ii, 34p. diags., photos., 6 tabs. (NACA Rept. 1170. Formerly TN 2933)

MECHANICAL PROPERTIES AT ROOM TEMPERATURE OF FOUR CERMETS OF TITANIUM CARBIDE WITH NICKEL BINDER. Aldie E. Johnson, Jr. August 1954. 22p. diags., photos., tabs. (NACA TN 3197)

MECHANICAL PROPERTIES AT ROOM TEMPERATURE OF FOUR CERMETS OF TUNGSTEN CARBIDE WITH COBALT BINDER. Aldie E. Johnson, Jr. December 1954. 16p. diags., photo., tab. (NACA TN 3309)

A DROP TEST FOR THE EVALUATION OF THE IMPACT STRENGTH OF CERMETS. B. Pinkel, G. C. Deutsch and N. H. Katz. March 1955. 8p. diags., photo. (NACA RM E54D13)



## Properties (5.2)

DESCRIPTION AND INVESTIGATION OF A DYNAMIC MODEL OF THE XH-17 TWO-BLADE JET-DRIVEN HELICOPTER. George W. Brooks and Maurice A. Sylvester. March 14, 1951. 49p. diags., photos., 6 tabs. (NACA RM L50I21)

ADHESIVE AND PROTECTIVE CHARACTERISTICS OF CERAMIC COATING A-417 AND ITS EFFECT ON ENGINE LIFE OF FORGED REFRACTALLOY-26 (AMS 5760) AND CAST STELLITE 21 (AMS 5385) TURBINE BLADES. Floyd B. Garrett and Charles A. Gyorgak. February 1953. 21p. photos., diagr., 4 tabs. (NACA RM E52L30)

BEHAVIOR OF MATERIALS UNDER CONDITIONS OF THERMAL STRESS. S. S. Manson. 1954. ii, 34p. diags., photos., 6 tabs. (NACA Rept. 1170. Formerly TN 2933)

A FIBROUS-GLASS COMPACT AS A PERMEABLE MATERIAL FOR BOUNDARY-LAYER-CONTROL APPLICATIONS USING AREA SUCTION. Robert E. Dannenberg, James A. Weiberg and Bruno J. Gambucci. January 1955. 20p. diags., photos., 2 tabs. (NACA TN 3388)

A DROP TEST FOR THE EVALUATION OF THE IMPACT STRENGTH OF CERMETS. B. Pinkel, G. C. Deutsch and N. H. Katz. March 1955. 8p. diags., photo. (NACA RM E54D13)

### TENSILE (5.2.1)

FABRICATION AND PROPERTIES OF HOT-PRESSED MOLYBDENUM DISILICIDE. Roger A. Long. August 24, 1950. 34p. diags., photos., tab. (NACA RM E50F22)

SOME FACTORS AFFECTING FABRICATION AND HIGH-TEMPERATURE STRENGTH OF MOLYBDENUM DISILICIDE. W. A. Maxwell. April 1952. 25p. diags., photos., 3 tabs. (NACA RM E52B06)

SOME STRESS-RUPTURE AND CREEP PROPERTIES OF MOLYBDENUM DISILICIDE IN THE RANGE 1600° TO 2000° F. W. A. Maxwell. June 1952. 19p. diags., photos., 2 tabs. (NACA RM E52D09)

TIME-TEMPERATURE PARAMETERS AND AN APPLICATION TO RUPTURE AND CREEP OF ALUMINUM ALLOYS. George J. Heimerl. June 1954. 35p. diags., tab. (NACA TN 3195)

PRELIMINARY INVESTIGATION OF STRESS-RUPTURE AND TENSILE STRENGTH OF THERMENOL, AN IRON-ALUMINUM ALLOY. Charles A. Gyorgak. August 1954. 11p. diags., 3 tabs. (NACA RM E54F10)

MECHANICAL PROPERTIES AT ROOM TEMPERATURE OF FOUR CERMETS OF TITANIUM CARBIDE WITH NICKEL BINDER. Aldie E. Johnson, Jr. August 1954. 22p. diags., photos., tabs. (NACA TN 3197)

INVESTIGATION OF NICKEL-ALUMINUM ALLOYS CONTAINING FROM 14 TO 34 PERCENT ALUMINUM. W. A. Maxwell and E. M. Grala. August 1954. 42p. diags., photos., 7 tabs. (NACA TN 3259)

EFFECTS OF MULTIAXIAL STRETCHING ON CRAZING AND OTHER PROPERTIES OF TRANSPARENT PLASTICS. Irvin Wolock and Desmond A. George, National Bureau of Standards. October 1954. 34p. diags., photos., 10 tabs. (NACA RM 54F22)

AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THE ANISOTROPY OF 3S ALUMINUM-ALLOY SHEET IN THE PLASTIC RANGE. Arthur J. McEvily, Jr. and Philip J. Hughes. October 1954. 45p. diags., photos., 4 tabs. (NACA TN 3248)

TENSILE AND COMPRESSIVE STRESS-STRAIN PROPERTIES OF SOME HIGH-STRENGTH SHEET ALLOYS AT ELEVATED TEMPERATURES. Philip J. Hughes, John E. Inge and Stanley B. Prosser. November 1954. 32p. diags., photos., 6 tabs. (NACA TN 3315)

MECHANICAL PROPERTIES AT ROOM TEMPERATURE OF FOUR CERMETS OF TUNGSTEN CARBIDE WITH COBALT BINDER. Aldie E. Johnson, Jr. December 1954. 16p. diags., photo., tab. (NACA TN 3309)

THEORY OF REVERSIBLE AND NONREVERSIBLE CRACKS IN SOLIDS. (Teoriya obratimyykh i neobratimyykh treshchin v tverdykh telakh). Y. I. Frenkel. April 1955. 14p. diags. (NACA TM 1387. Trans. from Zhurnal Tekhnicheskoi Fiziki, v. 22, no. 11, Nov., 1952, p. 1857-1866)

SOME OBSERVATIONS ON LOSS OF STATIC STRENGTH DUE TO FATIGUE CRACKS. Walter Illg and Herbert F. Hardrath. May 1955. 8p. diags. (NACA RM L55D15a)

### COMPRESSIVE (5.2.2)

MECHANICAL PROPERTIES AT ROOM TEMPERATURE OF FOUR CERMETS OF TITANIUM CARBIDE WITH NICKEL BINDER. Aldie E. Johnson, Jr. August 1954. 22p. diags., photos., tabs. (NACA TN 3197)

AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THE ANISOTROPY OF 3S ALUMINUM-ALLOY SHEET IN THE PLASTIC RANGE. Arthur J. McEvily, Jr. and Philip J. Hughes. October 1954. 45p. diags., photos., 4 tabs. (NACA TN 3248)

TENSILE AND COMPRESSIVE STRESS-STRAIN PROPERTIES OF SOME HIGH-STRENGTH SHEET ALLOYS AT ELEVATED TEMPERATURES. Philip J. Hughes, John E. Inge and Stanley B. Prosser. November 1954. 32p. diags., photos., 6 tabs. (NACA TN 3315)

## Compressive (Cont.)

MECHANICAL PROPERTIES AT ROOM TEMPERATURE OF FOUR CERMETS OF TUNGSTEN CARBIDE WITH COBALT BINDER. Aldie E. Johnson, Jr. December 1954. 16p. diags., photo., tab. (NACA TN 3309)

## CREEP (5.2.3)

SOME STRESS-RUPTURE AND CREEP PROPERTIES OF MOLYBDENUM DISILICIDE IN THE RANGE 1600° TO 2000° F. W. A. Maxwell. June 1952. 19p. diags., photos., 2 tabs. (NACA RM E52D09)

INVESTIGATION OF ENGINE PERFORMANCE AND HIGH-TEMPERATURE PROPERTIES OF PRECISION-CAST TURBINE BLADES OF HIGH-CARBON STELLITE 21 AND CONTROLLED-GRAIN-SIZE STELLITE 21. Charles Yaker, Floyd B. Garrett and Paul F. Sikora. June 1952. 38p. diags., photos., 6 tabs. (NACA RM E52D10)

TIME-TEMPERATURE PARAMETERS AND AN APPLICATION TO RUPTURE AND CREEP OF ALUMINUM ALLOYS. George J. Heimerl. June 1954. 35p. diags., tab. (NACA TN 3195)

AN INVESTIGATION OF THE CREEP LIFETIME OF 75S-T6 ALUMINUM-ALLOY COLUMNS. Eldon E. Mathauser and William A. Brooks, Jr. July 1954. 28p. diags., photos., tab. (NACA TN 3204)

INVESTIGATION OF NICKEL-ALUMINUM ALLOYS CONTAINING FROM 14 TO 34 PERCENT ALUMINUM. W. A. Maxwell and E. M. Grala. August 1954. 42p. diags., photos., 7 tabs. (NACA TN 3259)

INVESTIGATION OF STATIC STRENGTH AND CREEP BEHAVIOR OF AN ALUMINUM-ALLOY MULTIWEB BOX BEAM AT ELEVATED TEMPERATURES. Eldon E. Mathauser. November 1954. 21p. diags., photos., 4 tabs. (NACA TN 3310)

PLASTIC DEFORMATION OF ALUMINUM SINGLE CRYSTALS AT ELEVATED TEMPERATURES. R. D. Johnson, A. P. Young and A. D. Schwöpe, Battelle Memorial Institute. April 1955. 76p. diags., photos., 3 tabs. (NACA TN 3351)

## STRESS-RUPTURE (5.2.4)

SOME STRESS-RUPTURE AND CREEP PROPERTIES OF MOLYBDENUM DISILICIDE IN THE RANGE 1600° TO 2000° F. W. A. Maxwell. June 1952. 19p. diags., photos., 2 tabs. (NACA RM E52D09)

INVESTIGATION OF ENGINE PERFORMANCE AND HIGH-TEMPERATURE PROPERTIES OF PRECISION-CAST TURBINE BLADES OF HIGH-CARBON STELLITE 21 AND CONTROLLED-GRAIN-SIZE STELLITE 21. Charles Yaker, Floyd B. Garrett and Paul F. Sikora. June 1952. 38p. diags., photos., 6 tabs. (NACA RM E52D10)

BEHAVIOR OF FORGED S-816 TURBINE BLADES IN STEADY-STATE OPERATION OF J33-9 TURBOJET ENGINE WITH STRESS-RUPTURE AND METALLOGRAPHIC EVALUATIONS. F. B. Garrett, C. A. Gyorgak and J. W. Weeton. February 1953. 29p. diags., photos., 3 tabs. (NACA RM E52L17)

TIME-TEMPERATURE PARAMETERS AND AN APPLICATION TO RUPTURE AND CREEP OF ALUMINUM ALLOYS. George J. Heimerl. June 1954. 35p. diags., tab. (NACA TN 3195)

PRELIMINARY INVESTIGATION OF STRESS-RUPTURE AND TENSILE STRENGTH OF THERMENOL, AN IRON-ALUMINUM ALLOY. Charles A. Gyorgak. August 1954. 11p. diags., 3 tabs. (NACA RM E54F10)

INVESTIGATION OF NICKEL-ALUMINUM ALLOYS CONTAINING FROM 14 TO 34 PERCENT ALUMINUM. W. A. Maxwell and E. M. Grala. August 1954. 42p. diags., photos., 7 tabs. (NACA TN 3259)

COOPERATIVE INVESTIGATION OF RELATIONSHIP BETWEEN STATIC AND FATIGUE PROPERTIES OF WROUGHT N-155 ALLOY AT ELEVATED TEMPERATURES. NACA Subcommittee on Heat-Resisting Materials. April 1955. 92p. diags., photos., 13 tabs. (NACA TN 3216)

## FATIGUE (5.2.5)

ADDITIONAL STATIC AND FATIGUE TESTS OF HIGH-STRENGTH ALUMINUM-ALLOY BOLTED JOINTS. E. C. Hartmann, Marshall Holt and I. D. Eaton, Aluminum Company of America. July 1954. 42p. diags., photos., 7 tabs. (NACA TN 3269)

EXPERIMENTAL INVESTIGATION OF NOTCH-SIZE EFFECTS ON ROTATING-BEAM FATIGUE BEHAVIOR OF 75S-T6 ALUMINUM ALLOY. W. S. Hyler, R. A. Lewis and H. J. Grover, Battelle Memorial Institute. November 1954. 47p. diags., photos., 12 tabs. (NACA TN 3291)

STUDY OF EFFECTS OF MICROSTRUCTURE AND ANISOTROPY ON FATIGUE OF 24S-T4 ALUMINUM ALLOY. H. A. Lipsitt, G. E. Dieter, G. T. Horne and R. F. Mehl, Carnegie Institute of Technology. March 1955. 41p. diags., photos., 4 tabs. (NACA TN 3380)

COOPERATIVE INVESTIGATION OF RELATIONSHIP BETWEEN STATIC AND FATIGUE PROPERTIES OF WROUGHT N-155 ALLOY AT ELEVATED TEMPERATURES. NACA Subcommittee on Heat-Resisting Materials. April 1955. 92p. diags., photos., 13 tabs. (NACA TN 3216)

SOME OBSERVATIONS ON LOSS OF STATIC STRENGTH DUE TO FATIGUE CRACKS. Walter Illg and Herbert F. Hardrath. May 1955. 8p. diags. (NACA RM L55D15a)

PRELIMINARY INVESTIGATION OF THE FAILURE OF PRESSURIZED STIFFENED CYLINDERS. Norris F. Dow and Roger W. Peters. May 1955. 14p. diags., photos., tab. (NACA RM L55D15b)



## SHEAR (5.2.6)

MECHANICAL PROPERTIES AT ROOM TEMPERATURE OF FOUR CERMETS OF TITANIUM CARBIDE WITH NICKEL BINDER. Aldie E. Johnson, Jr. August 1954. 22p. diagrs., photos., tabs. (NACA TN 3197)

MECHANICAL PROPERTIES AT ROOM TEMPERATURE OF FOUR CERMETS OF TUNGSTEN CARBIDE WITH COBALT BINDER. Aldie E. Johnson, Jr. December 1954. 16p. diagrs., photo., tab. (NACA TN 3309)

PRELIMINARY INVESTIGATION OF PROPERTIES OF HIGH-TEMPERATURE BRAZED JOINTS PROCESSED IN VACUUM OR IN MOLTEN SALT. C. A. Gyorgak and A. C. Francisco. May 1955. 29p. diagrs., photos., 7 tabs. (NACA TN 3450)

## FLEXURAL (5.2.7)

EFFECTS OF RESIN COATING METHODS AND OTHER VARIABLES ON PHYSICAL PROPERTIES OF GLASS-FABRIC REINFORCED POLYESTERS. B. M. Axilrod, J. E. Wier and J. Mandel, National Bureau of Standards. August 1954. 22p., 6 tabs. (NACA RM 54G26)

COOPERATIVE INVESTIGATION OF RELATIONSHIP BETWEEN STATIC AND FATIGUE PROPERTIES OF WROUGHT N-155 ALLOY AT ELEVATED TEMPERATURES. NACA Subcommittee on Heat-Resisting Materials. April 1955. 92p. diagrs., photos., 13 tabs. (NACA TN 3216)

## CORROSION RESISTANCE (5.2.8)

ROLE OF NICKEL DIP IN ENAMELING OF SHEET STEEL. D. G. Moore, J. W. Pitts and W. N. Harrison, National Bureau of Standards. June 1954. 27p. diagrs., photos., 8 tabs. (NACA TN 3207)

EFFECTS OF ADDITIVES ON CORROSION AND MASS TRANSFER IN SODIUM HYDROXIDE - NICKEL SYSTEMS UNDER FREE-CONVECTION CONDITIONS. Americo F. Forestieri. August 1954. 13p. diagrs., photos., 6 tabs. (NACA RM E54E19)

INVESTIGATION OF NICKEL-ALUMINUM ALLOYS CONTAINING FROM 14 TO 34 PERCENT ALUMINUM. W. A. Maxwell and E. M. Grala. August 1954. 42p. diagrs., photos., 7 tabs. (NACA TN 3259)

INFLUENCE OF EXPOSED AREA ON STRESS-CORROSION CRACKING OF 24S ALUMINUM ALLOY. William H. Colner and Howard T. Francis, Armour Research Foundation. November 1954. 22p. diagrs., photos., tab. (NACA TN 3292)

CORROSION OF METALS OF CONSTRUCTION BY ALTERNATE EXPOSURE TO LIQUID AND GASEOUS FLUORINE. Richard M. Gundzik and Charles E. Feiler. December 1954. 10p. photos., 3 tabs. (NACA TN 3333)

INTERGRANULAR CORROSION OF HIGH-PURITY ALUMINUM IN HYDROCHLORIC ACID. I - EFFECTS OF HEAT TREATMENT, IRON CONTENT, AND ACID COMPOSITION. M. Metzger and J. Intrater, Columbia University. February 1955. 38p. photos., 8 tabs. (NACA TN 3281)

INTERGRANULAR CORROSION OF HIGH-PURITY ALUMINUM IN HYDROCHLORIC ACID. II - GRAIN-BOUNDARY SEGREGATION OF IMPURITY ATOMS. M. Metzger and J. Intrater, Columbia University. April 1955. 33p. diagrs., 4 tabs. (NACA TN 3282)

## STRUCTURE (5.2.9)

CORRELATION OF SUPERSONIC CONVECTIVE HEAT-TRANSFER COEFFICIENTS FROM MEASUREMENTS OF THE SKIN TEMPERATURE OF A PARABOLIC BODY OF REVOLUTION (NACA RM-10). Leo T. Chauvin and Carlos A. deMoraes. March 7, 1951. 39p. diagrs., photo. 2 tabs. (NACA RM L51A18)

SURVEY OF PORTIONS OF THE CHROMIUM-COBALT-NICKEL-MOLYBDENUM QUATERNARY SYSTEM AT 1200° C. Sheldon Paul Rideout and Paul A. Beck, University of Notre Dame. 1953. ii, 38p. diagrs., photos., 20 tabs. (NACA Rept. 1122. Formerly TN 2683)

HIGH-RESOLUTION AUTORADIOGRAPHY. George C. Towe, Henry J. Gomberg and J. W. Freeman, University of Michigan. July 1954. ii, 138p. diagrs., photos., 9 tabs. (NACA TN 3209)

AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THE ANISOTROPY OF 3S ALUMINUM-ALLOY SHEET IN THE PLASTIC RANGE. Arthur J. McEvily, Jr. and Philip J. Hughes. October 1954. 45p. diagrs., photos., 4 tabs. (NACA TN 3248)

THEORY OF REVERSIBLE AND NONREVERSIBLE CRACKS IN SOLIDS. (Teoriya obratimnykh i neobratimnykh treshchin v tverdykh telakh). Y. I. Frenkel. April 1955. 14p. diagrs. (NACA TM 1387. Trans. from Zhurnal Tekhnicheskoi Fiziki, v. 22, no. 11, Nov., 1952, p. 1857-1866)

ANALYSIS OF EAR FORMATION IN DEEP-DRAWN CUPS. Arthur J. McEvily, Jr. May 1955. 7p. diagrs. (NACA TN 3439)

PRELIMINARY INVESTIGATION OF PROPERTIES OF HIGH-TEMPERATURE BRAZED JOINTS PROCESSED IN VACUUM OR IN MOLTEN SALT. C. A. Gyorgak and A. C. Francisco. May 1955. 29p. diagrs., photos., 7 tabs. (NACA TN 3450)

## THERMAL

### (5.2.11)

PRELIMINARY INVESTIGATION OF THE HEAT-SHOCK RESISTANT PROPERTIES OF MOLYBDENUM DISILICIDE BLADES UNDER CENTRIFUGAL LOAD. Roger A. Long and John C. Freche. May 1952. 15p. diagrs., photos., tab. (NACA RM E52A17)

SURVEY OF PORTIONS OF THE CHROMIUM-COBALT-NICKEL-MOLYBDENUM QUATERNARY SYSTEM AT 1200° C. Sheldon Paul Rideout and Paul A. Beck, University of Notre Dame. 1953. ii, 38p. diagrs., photos., 20 tabs. (NACA Rept. 1122. Formerly TN 2683)

AN INVESTIGATION OF THE CREEP LIFETIME OF 75S-T6 ALUMINUM-ALLOY COLUMNS. Eldon E. Mathauser and William A. Brooks, Jr. July 1954. 28p. diagrs., photos., tab. (NACA TN 3204)

SOME EFFECTS OF EXPOSURE TO EXHAUST-GAS STREAMS ON EMITTANCE AND THERMOELECTRIC POWER OF BARE-WIRE PLATINUM RHODIUM - PLATINUM THERMOCOUPLES. George E. Glawe and Charles E. Shepard. August 1954. 30p. diagrs., photos. (NACA TN 3253)

INVESTIGATION OF STATIC STRENGTH AND CREEP BEHAVIOR OF AN ALUMINUM-ALLOY MULTIWEB BOX BEAM AT ELEVATED TEMPERATURES. Eldon E. Mathauser. November 1954. 21p. diagrs., photos., 4 tabs. (NACA TN 3310)

MEASURED EFFECTIVE THERMAL CONDUCTIVITY OF URANIUM OXIDE POWDER IN VARIOUS GASES AND GAS MIXTURES. J. S. Boegli and R. G. Deissler. March 1955. 20p. diagrs., tab. (NACA RM E54L10)

PLASTIC DEFORMATION OF ALUMINUM SINGLE CRYSTALS AT ELEVATED TEMPERATURES. R. D. Johnson, A. P. Young and A. D. Schwoppe, Battelle Memorial Institute. April 1955. 76p. diagrs., photos., 3 tabs. (NACA TN 3351)

EFFECT OF PRESSURE ON THERMAL CONDUCTANCE OF CONTACT JOINTS. Martin E. Barzelay, Kin Nee Tong and George F. Holloway, Syracuse University. May 1955. 52p. diagrs., 2 tabs. (NACA TN 3295)

## MULTIAXIAL STRESS

### (5.2.12)

COOPERATIVE INVESTIGATION OF RELATIONSHIP BETWEEN STATIC AND FATIGUE PROPERTIES OF WROUGHT N-155 ALLOY AT ELEVATED TEMPERATURES. NACA Subcommittee on Heat-Resisting Materials. April 1955. 92p. diagrs., photos., 13 tabs. (NACA TN 3216)

## PLASTICITY

### (5.2.13)

AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THE ANISOTROPY OF 3S ALUMINUM-ALLOY SHEET IN THE PLASTIC RANGE. Arthur J. McEvily, Jr. and Philip J. Hughes. October 1954. 45p. diagrs., photos., 4 tabs. (NACA TN 3248)

PLASTIC DEFORMATION OF ALUMINUM SINGLE CRYSTALS AT ELEVATED TEMPERATURES. R. D. Johnson, A. P. Young and A. D. Schwoppe, Battelle Memorial Institute. April 1955. 76p. diagrs., photos., 3 tabs. (NACA TN 3351)


ANALYSIS OF EAR FORMATION IN DEEP-DRAWN CUPS. Arthur J. McEvily, Jr. May 1955. 7p. diagrs. (NACA TN 3439)



## **Operating Stresses and Conditions**

### **(5.3)**

THE DESIGN OF BRITTLE-MATERIAL BLADE  
ROOTS BASED ON THEORY AND RUPTURE TESTS  
OF PLASTIC MODELS. Andre J. Meyer, Jr.,  
Albert Kaufman and William C. Caywood.  
April 6, 1953. 45p. diagrs., photos., tab. (NACA  
RM E53C12)



**METEOROLOGY**  
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# METEOROLOGY

## (6)

VARIATION OF LOCAL LIQUID-WATER CONCENTRATION ABOUT AN ELLIPSOID OF FINENESS RATIO 5 MOVING IN A DROPLET FIELD. Robert G. Dorsch and Rinaldo J. Brun. July 1954. 68p. diags., photos., 2 tabs. (NACA TN 3153)

KINETIC TREATMENT OF THE NUCLEATION IN SUPERSATURATED VAPORS. (*Kinetische Behandlung der Keimbildung in übersättigten Dämpfen*). R. Becker and W. Doring. September 1954. 43p. diags. (NACA TM 1374. Trans. from *Annalen der Physik*, Ser. 5, v. 24, 1935, p. 719-752).

VARIATION OF LOCAL LIQUID-WATER CONCENTRATION ABOUT AN ELLIPSOID OF FINENESS RATIO 10 MOVING IN A DROPLET FIELD. Rinaldo J. Brun and Robert G. Dorsch. April 1955. 51p. diags., photo., tab. (NACA TN 3410)

# Atmosphere

## (6.1)

A DYE-TRACER TECHNIQUE FOR EXPERIMENTALLY OBTAINING IMPINGEMENT CHARACTERISTICS OF ARBITRARY BODIES AND A METHOD FOR DETERMINING DROPLET SIZE DISTRIBUTION. Uwe H. von Glahn, Thomas F. Gelder and William H. Smyers, Jr. March 1955. 73p. diags., photos., tab. (NACA TN 3338)

### GUSTS

#### (6.1.2)

A STUDY OF THE APPLICATION OF POWER-SPECTRAL METHODS OF GENERALIZED HARMONIC ANALYSIS TO GUST LOADS ON AIRPLANES. Harry Press and Bernard Mazelsky. 1954. ii, 17p. diags., 2 tabs. (NACA Rept. 1172. Formerly TN 2853)

AN INVESTIGATION OF THE USE OF ROCKET-POWERED MODELS FOR GUST-LOAD STUDIES WITH AN APPLICATION TO A TAILLESS SWEEP-WING MODEL AT TRANSONIC SPEEDS. A. James Vitale, H. Press and C. C. Shufflebarger. June 1954. 36p. diags., photos., tab. (NACA TN 3161)

GUST-LOAD AND AIRSPEED DATA FROM ONE TYPE OF FOUR-ENGINE AIRPLANE ON FIVE ROUTES FROM 1947 TO 1954. Walter G. Walker. January 1955. 28p. diags., 4 tabs. (NACA TN 3358)

ANALYSIS OF ACCELERATIONS, GUST VELOCITIES, AND AIRSPEEDS FROM OPERATIONS OF A TWIN-ENGINE TRANSPORT AIRPLANE ON A TRANSCONTINENTAL ROUTE FROM 1950 TO 1952. Thomas L. Coleman and Walter G. Walker. February 1955. 16p. diags., 3 tabs. (NACA TN 3371)

AN ANALYSIS OF ACCELERATIONS, AIRSPEEDS, AND GUST VELOCITIES FROM THREE COMMERCIAL OPERATIONS OF ONE TYPE OF MEDIUM-ALTITUDE TRANSPORT AIRPLANE. Thomas L. Coleman, Martin R. Copp, Walter G. Walker and Jerome N. Engel. March 1955. 31p. diags., 4 tabs. (NACA TN 3365)

### STRUCTURE

#### (6.1.2.1)

INVESTIGATION OF MACH NUMBER CHANGES OBTAINED BY DISCHARGING HIGH-PRESSURE PULSE THROUGH WIND TUNNEL OPERATING SUPERSONICALLY. Rudolph C. Haefeli and Harry Bernstein. August 1954. 14p. diags., photos., tab. (NACA TN 3258)

### TURBULENCE

#### (6.1.2.3)

SOME MEASUREMENTS OF ATMOSPHERIC TURBULENCE OBTAINED FROM FLOW-DIRECTION VANES MOUNTED ON AN AIRPLANE. Robert G. Chilton. November 1954. 22p. diags., photo., tab. (NACA TN 3313)

ESTIMATES OF PROBABILITY DISTRIBUTION OF ROOT-MEAN-SQUARE GUST VELOCITY OF ATMOSPHERIC TURBULENCE FROM OPERATIONAL GUST-LOAD DATA BY RANDOM-PROCESS THEORY. Harry Press, May T. Meadows and Ivan Hadlock. March 1955. 48p. diags., 4 tabs. (NACA TN 3362)

SOME CALCULATIONS OF THE LATERAL RESPONSE OF TWO AIRPLANES TO ATMOSPHERIC TURBULENCE WITH RELATION TO THE LATERAL SNAKING PROBLEM. John D. Bird. May 1955. 24p. diags., 2 tabs. (NACA TN 3425. Formerly RM L50F26a)

### ALLEVIATION

#### (6.1.2.4)

A COMPARISON OF GUST LOADS MEASURED IN FLIGHT ON A SWEEP-WING AIRPLANE AND AN UNSWEEP-WING AIRPLANE. Jack Funk and Harry C. Mickleboro. June 1953. 16p. diags., 2 tabs. (NACA RM L52L02)



## Ice Formation (6.2)

IMPINGEMENT OF WATER DROPLETS ON WEDGES AND DOUBLE-WEDGE AIRFOILS AT SUPERSONIC SPEEDS. John S. Serafini. 1954. ii, 24p. diags. (NACA Rept. 1159. Formerly TN 2971)

A PROCEDURE FOR THE DESIGN OF AIR-HEATED ICE-PREVENTION SYSTEMS. Carr B. Neel, Jr. June 1954. 63p. diags., photo. (NACA TN 3130)

VARIATION OF LOCAL LIQUID-WATER CONCENTRATION ABOUT AN ELLIPSOID OF FINENESS RATIO 5 MOVING IN A DROPLET FIELD. Robert G. Dorsch and Rinaldo J. Brun. July 1954. 68p. diags., photos., 2 tabs. (NACA TN 3153)

IMPINGEMENT OF WATER DROPLETS ON NACA 65A004 AIRFOIL AT  $8^\circ$  ANGLE OF ATTACK. Rinaldo J. Brun, Helen M. Gallagher and Dorothea E. Vogt. July 1954. 27p. diags. (NACA TN 3155)

A HEATED-WIRE LIQUID-WATER-CONTENT INSTRUMENT AND RESULTS OF INITIAL FLIGHT TESTS IN ICING CONDITIONS. Carr B. Neel. January 1955. 33p. diags., photos., tab. (NACA RM A54123)

INGESTION OF FOREIGN OBJECTS INTO TURBINE ENGINES BY VORTICES. Lewis A. Rodert and Floyd B. Garrett. February 1955. 23p. diags., photos. (NACA TN 3330)

ICING LIMIT AND WET-SURFACE TEMPERATURE VARIATION FOR TWO AIRFOIL SHAPES UNDER SIMULATED HIGH-SPEED FLIGHT CONDITIONS. Willard D. Coles. February 1955. 33p. diags., photos. (NACA TN 3396)

A DYE-TRACER TECHNIQUE FOR EXPERIMENTALLY OBTAINING IMPINGEMENT CHARACTERISTICS OF ARBITRARY BODIES AND A METHOD FOR DETERMINING DROPLET SIZE DISTRIBUTION. Uwe H. von Glahn, Thomas F. Gelder and William H. Smyers, Jr. March 1955. 73p. diags., photos., tab. (NACA TN 3338)

VARIATION OF LOCAL LIQUID-WATER CONCENTRATION ABOUT AN ELLIPSOID OF FINENESS RATIO 10 MOVING IN A DROPLET FIELD. Rinaldo J. Brun and Robert G. Dorsch. April 1955. 51p. diags., photo., tab. (NACA TN 3410)

**OPERATING PROBLEMS**  
**(7)**



## OPERATING PROBLEMS

### (7)

DROP HAMMER TESTS WITH THREE OLEO STRUT MODELS AND THREE DIFFERENT SHOCK STRUT OILS AT LOW TEMPERATURES. (Fallhammerversuche mit drei Ölfederstrebenmustern und drei verschiedenen Federstrebenölen bei tiefen Temperaturen). Kranz. July 1954. 55p. diagrs., photos., 10 tabs. (NACA TM 1372. Trans. from Zentrale für wissenschaftliches Berichtswesen der Luftfahrtforschung, Berlin, UM 564, Jan. 17, 1939)

GUST-LOAD AND AIRSPEED DATA FROM ONE TYPE OF FOUR-ENGINE AIRPLANE ON FIVE ROUTES FROM 1947 TO 1954. Walter G. Walker. January 1955. 28p. diagrs., 4 tabs. (NACA TN 3358)

ANALYSIS OF ACCELERATIONS, GUST VELOCITIES, AND AIRSPEEDS FROM OPERATIONS OF A TWIN-ENGINE TRANSPORT AIRPLANE ON A TRANSCONTINENTAL ROUTE FROM 1950 TO 1952. Thomas L. Coleman and Walter G. Walker. February 1955. 16p. diagrs., 3 tabs. (NACA TN 3371)

AN INVESTIGATION OF DRAINS DISCHARGING LIQUID INTO SUBSONIC AND TRANSONIC STREAMS. Allen R. Vick and Frank V. Silhan. March 1955. 54p. diagrs., photos., tab. (NACA TN 3359)

AN ANALYSIS OF ACCELERATIONS, AIRSPEEDS, AND GUST VELOCITIES FROM THREE COMMERCIAL OPERATIONS OF ONE TYPE OF MEDIUM-ALTITUDE TRANSPORT AIRPLANE. Thomas L. Coleman, Martin R. Copp, Walter G. Walker and Jerome N. Engel. March 1955. 31p. diagrs., 4 tabs. (NACA TN 3365)

INVESTIGATION OF JET-ENGINE NOISE REDUCTION BY SCREENS LOCATED TRANSVERSELY ACROSS THE JET. Edmund E. Callaghan and Willard D. Coles. May 1955. 27p. diagrs., photos., tab. (NACA TN 3452)

## Safety

### (7.1)

FLIGHT INVESTIGATION OF THE JETTISONABLE-NOSE METHOD OF PILOT ESCAPE USING ROCKET-PROPELLED MODELS. Reginald R. Lundstrom and Burke R. O'Kelly. June 2, 1949. 27p. diagrs., photos., 2 tabs. (NACA RM L9D11)

AN INVESTIGATION OF THE SPIN, RECOVERY, AND TUMBLING CHARACTERISTICS OF A 1/20-SCALE MODEL OF THE NORTHROP X-4 AIRPLANE. Lawrence J. Gale, Ira P. Jones, Jr. and Jack H. Wilson. January 4, 1950. 27p. diagrs., photos., 4 tabs. (NACA RM L9K28)

SPIN-TUNNEL INVESTIGATION OF A MODEL OF A 60° DELTA-WING AIRPLANE TO DETERMINE THE SPIN, RECOVERY, AND LONGITUDINAL TRIM CHARACTERISTICS THROUGHOUT AN EXTENSIVE RANGE OF MASS LOADINGS. Walter J. Klinar and Ira P. Jones, Jr. February 15, 1950. 56p. diagrs., photos., 6 charts, 4 tabs. (NACA RM L9L06)

THE PATH AND MOTION OF SCALE MODELS OF JETTISONABLE NOSE SECTIONS AT SUPERSONIC SPEEDS AS DETERMINED FROM AN INVESTIGATION IN THE LANGLEY FREE-FLIGHT APPARATUS. Lawrence J. Gale. May 23, 1950. 35p. diagrs., photos., 2 tabs. (NACA RM L9J13a)

SPIN AND RECOVERY CHARACTERISTICS OF A MODEL OF A FIGHTER TYPE OF AIRPLANE WITHOUT A HORIZONTAL TAIL AND HAVING EITHER A SINGLE VERTICAL TAIL OR TWIN VERTICAL TAILS. Lawrence J. Gale and Norman E. Pumphrey. July 25, 1950. 23p. diagrs., photos., 2 tabs. (NACA RM L50F19a)

SURVEY OF LESS-INFLAMMABLE HYDRAULIC FLUIDS FOR AIRCRAFT. Wray V. Drake and I. L. Drell. September 7, 1950. 64p. 14 tabs. (NACA RM E50F29)

SPIN-TUNNEL INVESTIGATION OF A MODEL OF A SWEEP-WING FIGHTER AIRPLANE OVER A WIDE RANGE OF FUSELAGE-HEAVY LOADINGS. Theodore Berman. December 27, 1950. 51p. diagrs., photos., 2 tabs. (NACA RM L50L08)

STATIC LONGITUDINAL STABILITY AND DYNAMIC CHARACTERISTICS AT HIGH ANGLES OF ATTACK AND AT LOW REYNOLDS NUMBERS OF A MODEL OF THE X-3 SUPERSONIC RESEARCH AIRPLANE. Sanger M. Burk, Jr. and Burton E. Hultz. February 6, 1951. 76p. diagrs., photos., 4 tabs. (NACA RM L50L19)

EFFECT OF CURRENT DESIGN TRENDS ON AIRPLANE SPINS AND RECOVERIES. Anshul I. Neihouse. January 1952. 6p. diagrs. (NACA RM L52A09)

MECHANISM OF START AND DEVELOPMENT OF AIRCRAFT CRASH FIRES. I. Irving Pinkel, G. Merritt Preston and Gerald J. Pesman. 1953. iii, 52p. diagrs., photos., 2 tabs. (NACA Rept. 1133. Formerly RM E52F06)

WIND-TUNNEL INVESTIGATION OF THE BEHAVIOR OF PARACHUTES IN CLOSE PROXIMITY TO ONE ANOTHER. Stanley H. Scher. August 1953. 12p. photos. (NACA RM L53G07)

ANALYTICAL DETERMINATION OF THE MECHANISM OF AN AIRPLANE SPIN RECOVERY WITH DIFFERENT APPLIED YAWING MOMENTS BY USE OF ROTARY-BALANCE DATA. Sanger M. Burk, Jr. December 1954. 43p. diagrs., 2 tabs. (NACA TN 3321)

PRELIMINARY INVESTIGATION OF A STICK SHAKER AS A LIFT-MARGIN INDICATOR. James P. Trant, Jr. February 1955. 19p. diagrs., photos. (NACA TN 3355)

CIRCUMFERENTIAL DISTRIBUTION OF PROPELLER-SLIPSTREAM TOTAL-PRESSURE RISE AT ONE RADIAL STATION OF A TWIN-ENGINE TRANSPORT AIRPLANE. A. W. Vogeley and H. A. Hart. April 1955. 24p. diagrs., photos. (NACA TN 3432)

## PILOT-ESCAPE TECHNIQUES

### (7.1.1)

SUMMARY OF RESULTS OF TUMBLING INVESTIGATIONS MADE IN THE LANGLEY 20-FOOT FREE-SPINNING TUNNEL ON 14 DYNAMIC MODELS. Ralph W. Stone, Jr. and Robert L. Bryant. December 31, 1948. 91p. diagrs., photos., 23 tabs. (NACA RM L8J28)

AN EMPIRICAL CRITERION FOR FIN STABILIZING JETTISONABLE NOSE SECTIONS OF AIRPLANES. Stanley H. Scher. December 8, 1949. 21p. diagrs., photo., tab. (NACA RM L9I28)

WIND-TUNNEL INVESTIGATION AT LOW SPEED TO DETERMINE AERODYNAMIC PROPERTIES OF A JETTISONABLE NOSE SECTION WITH CIRCULAR CROSS SECTION. Roscoe H. Goodwin. May 19, 1950. 38p. diagrs., photos. (NACA RM L9J13)

MOTION OF A TRANSONIC AIRPLANE NOSE SECTION WHEN JETTISONED AS DETERMINED FROM WIND-TUNNEL INVESTIGATIONS ON A 1/25-SCALE MODEL. Stanley H. Scher and Lawrence J. Gale. May 26, 1950. 64p. diagrs., photos., tab. (NACA RM L9L08a)

THE CALCULATION OF THE PATH OF A JETTISONABLE NOSE SECTION. Roscoe H. Goodwin. September 7, 1950. 35p. diagrs. (NACA RM L50G18)

ESTIMATED DECELERATION OF AIRPLANE NOSE SECTION JETTISONED AT VARIOUS ALTITUDES AND AIRSPEEDS. Stanley H. Scher. January 8, 1951. 39p. diagrs. (NACA RM L50K09)



## Ice Prevention and Removal

### (7.3)

ICING LIMIT AND WET-SURFACE TEMPERATURE VARIATION FOR TWO AIRFOIL SHAPES UNDER SIMULATED HIGH-SPEED FLIGHT CONDITIONS.

Willard D. Coles. February 1955. 33p. diagrs., photos. (NACA TN 3396)

A DYE-TRACER TECHNIQUE FOR EXPERIMENTALLY OBTAINING IMPINGEMENT CHARACTERISTICS OF ARBITRARY BODIES AND A METHOD FOR DETERMINING DROPLET SIZE DISTRIBUTION.

Uwe H. von Glahn, Thomas F. Gelder and William H. Smyers, Jr. March 1955. 73p. diagrs., photos., tab. (NACA TN 3338)

### PROPELLERS

#### (7.3.2)

A PROCEDURE FOR THE DESIGN OF AIR-HEATED ICE-PREVENTION SYSTEMS. Carr B. Neel, Jr. June 1954. 63p. diagrs., photo. (NACA TN 3130)

IMPINGEMENT OF WATER DROPLETS ON NACA 65A004 AIRFOIL AT 8° ANGLE OF ATTACK.

Rinaldo J. Brun, Helen M. Gallagher and Dorothea E. Vogt. July 1954. 27p. diagrs. (NACA TN 3155)

### WINGS AND TAILS

#### (7.3.3)

IMPINGEMENT OF WATER DROPLETS ON WEDGES AND DOUBLE-WEDGE AIRFOILS AT SUPERSONIC SPEEDS. John S. Serafini. 1954. ii, 24p. diagrs. (NACA Rept. 1159. Formerly TN 2971)

A PROCEDURE FOR THE DESIGN OF AIR-HEATED ICE-PREVENTION SYSTEMS. Carr B. Neel, Jr. June 1954. 63p. diagrs., photo. (NACA TN 3130)

IMPINGEMENT OF WATER DROPLETS ON NACA 65A004 AIRFOIL AT 8° ANGLE OF ATTACK.

Rinaldo J. Brun, Helen M. Gallagher and Dorothea E. Vogt. July 1954. 27p. diagrs. (NACA TN 3155)

ICING LIMIT AND WET-SURFACE TEMPERATURE VARIATION FOR TWO AIRFOIL SHAPES UNDER SIMULATED HIGH-SPEED FLIGHT CONDITIONS.

Willard D. Coles. February 1955. 33p. diagrs., photos. (NACA TN 3396)

### WINDSHIELDS

#### (7.3.4)

A PROCEDURE FOR THE DESIGN OF AIR-HEATED ICE-PREVENTION SYSTEMS. Carr B. Neel, Jr. June 1954. 63p. diagrs., photo. (NACA TN 3130)

### MISCELLANEOUS

#### ACCESSORIES

#### (7.3.5)

A PROCEDURE FOR THE DESIGN OF AIR-HEATED ICE-PREVENTION SYSTEMS. Carr B. Neel, Jr. June 1954. 63p. diagrs., photo. (NACA TN 3130)

VARIATION OF LOCAL LIQUID-WATER CONCENTRATION ABOUT AN ELLIPSOID OF FINENESS RATIO 5 MOVING IN A DROPLET FIELD. Robert G. Dorsch and Rinaldo J. Brun. July 1954. 68p. diagrs., photos., 2 tabs. (NACA TN 3153)

VARIATION OF LOCAL LIQUID-WATER CONCENTRATION ABOUT AN ELLIPSOID OF FINENESS RATIO 10 MOVING IN A DROPLET FIELD. Rinaldo J. Brun and Robert G. Dorsch. April 1955. 51p. diagrs., photo., tab. (NACA TN 3410)

### PROPULSION SYSTEMS

#### (7.3.6)

INVESTIGATION OF POWER REQUIREMENTS FOR ICE PREVENTION AND CYCLICAL DE-ICING OF INLET GUIDE VANES WITH INTERNAL ELECTRIC HEATERS. Uwe von Glahn and Robert E. Blatz. December 1, 1950. 49p. diagrs., photos. (NACA RM E50H29)

ICING CHARACTERISTICS AND ANTI-ICING HEAT REQUIREMENTS FOR HOLLOW AND INTERNALLY MODIFIED GAS-HEATED INLET GUIDE VANES. Vernon H. Gray and Dean T. Bowden. December 5, 1950. 49p. diagrs., photos. (NACA RM E50I08)

INGESTION OF FOREIGN OBJECTS INTO TURBINE ENGINES BY VORTICES. Lewis A. Rodert and Floyd B. Garrett. February 1955. 23p. diagrs., photos. (NACA TN 3330)

## Noise

### (7.4)

EXPERIMENTS TO DETERMINE NEIGHBORHOOD REACTIONS TO LIGHT AIRPLANES WITH AND WITHOUT EXTERNAL NOISE REDUCTION. Fred S. Elwell, Aeronautical Research Foundation. 1953. ii, 43p. diags., photos., 12 tabs. (NACA Rept. 1156. Formerly TN 2728)

THE NEAR NOISE FIELD OF STATIC JETS AND SOME MODEL STUDIES OF DEVICES FOR NOISE REDUCTION. Leslie W. Lassiter and Harvey H. Hubbard. July 1954. 38p. diags., photos. (NACA TN 3187)

OSCILLATING PRESSURES NEAR A STATIC PUSHER PROPELLER AT TIP MACH NUMBERS UP TO 1.20 WITH SPECIAL REFERENCE TO THE EFFECTS OF THE PRESENCE OF THE WING. Harvey H. Hubbard and Leslie W. Lassiter. July 1954. 35p. diags., photos., tab. (NACA TN 3202)

SHOCK-TURBULENCE INTERACTION AND THE GENERATION OF NOISE. H. S. Ribner. July 1954. 60p. diags., tab. (NACA TN 3255)

SOME ASPECTS OF THE HELICOPTER NOISE PROBLEM. Harvey H. Hubbard and Leslie W. Lassiter. August 1954. 14p. diags., photo. (NACA TN 3239)

INVESTIGATION OF NOISE FIELD AND VELOCITY PROFILES OF AN AFTERBURNING ENGINE. Warren J. North, Edmund E. Callaghan and Chester D. Lanzo. September 1954. 23p. diags., photos. (NACA RM E54G07)

TRANSVERSE OSCILLATIONS IN A CYLINDRICAL COMBUSTION CHAMBER. Franklin K. Moore and Stephen H. Maslen. October 1954. 25p. diags. (NACA TN 3152)

SOME MEASUREMENTS OF NOISE FROM THREE SOLID-FUEL ROCKET ENGINES. Leslie W. Lassiter and Robert H. Heitkotter. December 1954. 21p. diags. (NACA TN 3316)

A SURVEY OF BACKGROUND AND AIRCRAFT NOISE IN COMMUNITIES NEAR AIRPORTS. K. N. Stevens, Bolt Beranek and Newman, Inc. December 1954. 36p. diags., tab. (NACA TN 3379)

MEASUREMENTS OF FREE-SPACE OSCILLATING PRESSURES NEAR A PROPELLER AT FLIGHT MACH NUMBERS TO 0.72. Arthur W. Vogeley and Max C. Kurbjun. May 1955. 24p. diags., photos., tab. (NACA TN 3417)

INVESTIGATION OF JET-ENGINE NOISE REDUCTION BY SCREENS LOCATED TRANSVERSELY ACROSS THE JET. Edmund E. Callaghan and Willard D. Coles. May 1955. 27p. diags., photos., tab. (NACA TN 3452)



## Piloting Techniques

### (7.7)

MEASURED CHARACTERISTICS OF THE DOUGLAS D-558-1 AIRPLANE (BUAERO NO. 37971) IN TWO LANDINGS. Hubert M. Drake. June 3, 1949. 8p. diags., photos. (NACA RM L9D20a)

AN INVESTIGATION OF THE SPIN, RECOVERY, AND TUMBLING CHARACTERISTICS OF A 1/20-SCALE MODEL OF THE NORTHROP X-4 AIRPLANE. Lawrence J. Gale, Ira P. Jones, Jr. and Jack H. Wilson. January 4, 1950. 27p. diags., photos., 4 tabs. (NACA RM L9K28)

SPIN AND RECOVERY CHARACTERISTICS OF A MODEL OF A FIGHTER TYPE OF AIRPLANE WITHOUT A HORIZONTAL TAIL AND HAVING EITHER A SINGLE VERTICAL TAIL OR TWIN VERTICAL TAILS. Lawrence J. Gale and Norman E. Pumphrey. July 25, 1950. 23p. diags., photos., 2 tabs. (NACA RM L50F19a)

SPIN-TUNNEL INVESTIGATION OF A MODEL OF A SWEPT-WING FIGHTER AIRPLANE OVER A WIDE RANGE OF FUSELAGE-HEAVY LOADINGS. Theodore Berman. December 27, 1950. 51p. diags., photos., 2 tabs. (NACA RM L50L08)

EFFECT OF CURRENT DESIGN TRENDS ON AIRPLANE SPINS AND RECOVERIES. Anshul I. Neihouse. January 1952. 6p. diags. (NACA RM L52A09)

PRELIMINARY INVESTIGATION OF A STICK SHAKER AS A LIFT-MARGIN INDICATOR. James P. Trant, Jr. February 1955. 19p. diags., photos. (NACA TN 3355)

GROUND-SIMULATOR STUDY OF THE EFFECTS OF STICK FORCE AND DISPLACEMENT ON TRACKING PERFORMANCE. Stanley Faber. April 1955. 21p. diags., photos. (NACA TN 3428)

## Physiological

(7.8)

AN EMPIRICAL CRITERION FOR FIN STABILIZING JETTISONABLE NOSE SECTIONS OF AIRPLANES. Stanley H. Scher. December 8, 1949. 21p. diags., photo., tab. (NACA RM L9I28)

MOTION OF A TRANSONIC AIRPLANE NOSE SECTION WHEN JETTISONED AS DETERMINED FROM WIND-TUNNEL INVESTIGATIONS ON A 1/25-SCALE MODEL. Stanley H. Scher and Lawrence J. Gale. May 26, 1950. 64p. diags., photos., tab. (NACA RM L9L08a)

ESTIMATED DECELERATION OF AIRPLANE NOSE SECTION JETTISONED AT VARIOUS ALTITUDES AND AIRSPEEDS. Stanley H. Scher. January 8, 1951. 39p. diags. (NACA RM L50K09)



## Fire Hazards

### (7.9)

**SURVEY OF LESS-INFLAMMABLE HYDRAULIC FLUIDS FOR AIRCRAFT.** Wray V. Drake and I. L. Drell. September 7, 1950. 64p. 14 tabs. (NACA RM E50F29)

**MECHANISM OF START AND DEVELOPMENT OF AIRCRAFT CRASH FIRES.** I. Irving Pinkel, G. Merritt Preston and Gerald J. Pesman. 1953. iii, 52p. diagrs., photos., 2 tabs. (NACA Rept. 1133. Formerly RM E52F06)

## General

### (7.10)

FLIGHT INVESTIGATION OF THE EFFECT OF SIDESLIP ON THE PRESSURE AT THE STATIC ORIFICES OF THE BOEING B-29 AIRPLANE. Robert G. Chilton and B. Porter Brown. April 11, 1951. 12p. diags. (NACA RM L50J30)

EXPERIMENTS TO DETERMINE NEIGHBORHOOD REACTIONS TO LIGHT AIRPLANES WITH AND WITHOUT EXTERNAL NOISE REDUCTION. Fred S. Elwell, Aeronautical Research Foundation. 1953. ii, 43p. diags., photos., 12 tabs. (NACA Rept. 1156. Formerly TN 2728)

INGESTION OF FOREIGN OBJECTS INTO TURBINE ENGINES BY VORTICES. Lewis A. Rodert and Floyd B. Garrett. February 1955. 23p. diags., photos. (NACA TN 3330)



**INSTRUMENTS**  
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# INSTRUMENTS

(8)

DETERMINATION OF FLAME TEMPERATURES  
FROM 2000° TO 3000° K BY MICROWAVE ABSORP-  
TION. Perry W. Kuhns. August 1954. 48p.  
diags., photo., 2 tabs. (NACA TN 3254)

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## Flight (8.1)

THE STATIC-PRESSURE ERROR OF WING AND FUSELAGE AIRSPEED INSTALLATIONS OF THE X-1 AIRPLANES IN TRANSONIC FLIGHT. Harold R. Goodman and Roxanah B. Yancey. July 22, 1949. 20p. diagsr. (NACA RM L9G22)

FLIGHT CALIBRATION OF FOUR AIRSPEED SYSTEMS ON A SWEEP-WING AIRPLANE AT MACH NUMBERS UP TO 1.04 BY THE NACA RADAR-PHOTOTHEODOLITE METHOD. Jim Rogers Thompson, Richard S. Bray and George E. Cooper. October 27, 1950. 41p. diagsr., photos., tab. (NACA RM A50H24)

ERROR IN AIRSPEED MEASUREMENT DUE TO STATIC-PRESSURE FIELD AHEAD OF THE WING TIP OF A SWEEP-WING AIRPLANE MODEL AT TRANSONIC SPEEDS. Edward C. B. Danforth and Thomas C. O'Bryan. March 1, 1951. 16p. diagsr., photo. (NACA RM L50L28)

SKIN-TEMPERATURE TELEMETER FOR DETERMINING BOUNDARY-LAYER HEAT-TRANSFER COEFFICIENTS. Clifford L. Fricke and Francis B. Smith. March 15, 1951. 22p. diagsr. (NACA RM L50J17)

FLIGHT INVESTIGATION OF THE EFFECT OF SIDESLIP ON THE PRESSURE AT THE STATIC ORIFICES OF THE BOEING B-29 AIRPLANE. Robert G. Chilton and B. Porter Brown. April 11, 1951. 12p. diagsr. (NACA RM L50J30)

WIND-TUNNEL INVESTIGATION OF A SHIELDED TOTAL-PRESSURE TUBE AT TRANSONIC SPEEDS. William Gracey, Albin O. Pearson and Walter R. Russell. January 1952. 8p. diagsr. (NACA RM L51K19)

ERROR IN AIRSPEED MEASUREMENT DUE TO STATIC-PRESSURE FIELD AHEAD OF AN OPEN-NOSE AIR-INLET MODEL AT TRANSONIC SPEEDS. Thomas C. O'Bryan. March 1952. 17p. diagsr., photos. (NACA RM L52A17)

CALIBRATION OF A COMBINED PITOT-STATIC TUBE AND VANE-TYPE FLOW ANGULARITY INDICATOR AT TRANSONIC SPEEDS AND AT LARGE ANGLES OF ATTACK OR YAW. Albin O. Pearson and Harold A. Brown. September 1952. 25p. diagsr., photos. (NACA RM L52F24)

A METHOD OF CALIBRATING AIRSPEED INSTALLATIONS ON AIRPLANES AT TRANSONIC AND SUPERSONIC SPEEDS BY THE USE OF ACCELEROMETER AND ATTITUDE-ANGLE MEASUREMENTS. John A. Zalovcik, Lindsay J. Lina and James P. Trant, Jr. 1953. ii, 13p. diagsr., photos., tab. (NACA Rept. 1145. Formerly TN 2099; TN 2570)

VARIATION OF LOCAL LIQUID-WATER CONCENTRATION ABOUT AN ELLIPSOID OF FINENESS RATIO 5 MOVING IN A DROPLET FIELD. Robert G. Dorsch and Rinaldo J. Brun. July 1954. 68p. diagsr., photos., 2 tabs. (NACA TN 3153)

THEORETICAL INVESTIGATION AT SUBSONIC SPEEDS OF THE FLOW AHEAD OF A SLENDER INCLINED PARABOLIC-ARC BODY OF REVOLUTION AND CORRELATION WITH EXPERIMENTAL DATA OBTAINED AT LOW SPEEDS. William Letko and Edward C. B. Danforth, III. July 1954. 56p. diagsr. (NACA TN 3205)

RECOVERY CORRECTIONS FOR BUTT-WELDED, STRAIGHT-WIRE THERMOCOUPLES IN HIGH-VELOCITY, HIGH-TEMPERATURE GAS STREAMS. Frederick S. Simmons. September 1954. 19p. diagsr. (NACA RM E54G22a)

DESCRIPTION AND PRELIMINARY FLIGHT INVESTIGATION OF AN INSTRUMENT FOR DETECTING SUBNORMAL ACCELERATION DURING TAKE-OFF. Garland J. Morris and Lindsay J. Lina. November 1954. 19p. diagsr., photos. (NACA TN 3252)

A HEATED-WIRE LIQUID-WATER-CONTENT INSTRUMENT AND RESULTS OF INITIAL FLIGHT TESTS IN ICING CONDITIONS. Carr B. Neel. January 1955. 33p. diagsr., photos., tab. (NACA RM A54I23)

PRELIMINARY INVESTIGATION OF A STICK SHAKER AS A LIFT-MARGIN INDICATOR. James P. Trant, Jr. February 1955. 19p. diagsr., photos. (NACA TN 3355)

TWO MINIATURE TEMPERATURE RECORDERS FOR FLIGHT USE. John V. Foster. April 1955. 13p. diagsr., photos. (NACA TN 3392)

VARIATION OF LOCAL LIQUID-WATER CONCENTRATION ABOUT AN ELLIPSOID OF FINENESS RATIO 10 MOVING IN A DROPLET FIELD. Rinaldo J. Brun and Robert G. Dorsch. April 1955. 51p. diagsr., photo., tab. (NACA TN 3410)

CIRCUMFERENTIAL DISTRIBUTION OF PROPELLER-SLIPSTREAM TOTAL-PRESSURE RISE AT ONE RADIAL STATION OF A TWIN-ENGINE TRANSPORT AIRPLANE. A. W. Vogeley and H. A. Hart. April 1955. 24p. diagsr., photos. (NACA TN 3432)

MEASUREMENTS OF FREE-SPACE OSCILLATING PRESSURES NEAR A PROPELLER AT FLIGHT MACH NUMBERS TO 0.72. Arthur W. Vogeley and Max C. Kurbjun. May 1955. 24p. diagsr., photos., tab. (NACA TN 3417)

AN NACA VANE-TYPE ANGLE-OF-ATTACK INDICATOR FOR USE AT SUBSONIC AND SUPERSONIC SPEEDS. Jesse L. Mitchell and Robert F. Peck. May 1955. 8p. diagsr., photo. (NACA TN 3441. Formerly RM L9F28a)

## Laboratory (8.2)

INSTRUMENTATION FOR RECORDING TRANSIENT PERFORMANCE OF GAS-TURBINE ENGINES AND CONTROL SYSTEMS. Gene J. Delio and Glennon V. Schwent. June 27, 1951. 27p. diags., photos. (NACA RM E51D27)

SOME EFFECTS OF EXPOSURE TO EXHAUST-GAS STREAMS ON EMITTANCE AND THERMOELECTRIC POWER OF BARE-WIRE PLATINUM RHODIUM - PLATINUM THERMOCOUPLES. George E. Glawe and Charles E. Shepard. August 1954. 30p. diags., photos. (NACA TN 3253)

RECOVERY CORRECTIONS FOR BUTT-WELDED, STRAIGHT-WIRE THERMOCOUPLES IN HIGH-VELOCITY, HIGH-TEMPERATURE GAS STREAMS. Frederick S. Simmons. September 1954. 19p. diags. (NACA RM E54G22a)

SHEARING-STRESS MEASUREMENTS BY USE OF A HEATED ELEMENT. H. W. Liepmann and G. T. Skinner, California Institute of Technology. November 1954. 27p. diags. (NACA TN 3268)

USE OF A HOT-WIRE ANEMOMETER IN SHOCK-TUBE INVESTIGATIONS. Darshan Singh Dosanjh, Johns Hopkins University. December 1954. ii, 98p. diags., photos. (NACA TN 3163)

A SELF-EXCITED, ALTERNATING-CURRENT, CONSTANT-TEMPERATURE HOT-WIRE ANEMOMETER. Charles E. Shepard. April 1955. 29p. diags., photos. (NACA TN 3406)

ANALYTIC DETERMINATION OF THE DISCHARGE COEFFICIENTS OF FLOW NOZZLES. Frederick S. Simmons. April 1955. 15p. diags. (NACA TN 3447)

HEAT-LOSS CHARACTERISTICS OF HOT-WIRE ANEMOMETERS AT VARIOUS DENSITIES IN TRANSONIC AND SUPERSONIC FLOW. W. G. Spangenberg, National Bureau of Standards. May 1955. 82p. diags., photos., 14 tabs. (NACA TN 3381)



## Meteorological (8.3)

VARIATION OF LOCAL LIQUID-WATER CONCENTRATION ABOUT AN ELLIPSOID OF FINENESS RATIO 5 MOVING IN A DROPLET FIELD. Robert G. Dorsch and Rinaldo J. Brun. July 1954. 68p. diags., photos., 2 tabs. (NACA TN 3153)

A HEATED-WIRE LIQUID-WATER-CONTENT INSTRUMENT AND RESULTS OF INITIAL FLIGHT TESTS IN ICING CONDITIONS. Carr B. Neel. January 1955. 33p. diags., photos., tab. (NACA RM A54123)

VARIATION OF LOCAL LIQUID-WATER CONCENTRATION ABOUT AN ELLIPSOID OF FINENESS RATIO 10 MOVING IN A DROPLET FIELD. Rinaldo J. Brun and Robert G. Dorsch. April 1955. 51p. diags., photo., tab. (NACA TN 3410)

Metallurgical  
(E.B.)

# RESEARCH EQUIPMENT AND TECHNIQUES (9)



# RESEARCH EQUIPMENT and TECHNIQUES (9)

APPLICATIONS OF AUXILIARY AIR INJECTORS TO SUPERSONIC WIND TUNNELS. Joseph M. Spiegel, Robert U. Hofstetter and Donald M. Kuehn. November 1953. 53p. diags., photos. (NACA RM A53101)

DETERMINATION OF FLAME TEMPERATURES FROM 2000° TO 3000° K BY MICROWAVE ABSORPTION. Perry W. Kuhns. August 1954. 48p. diags., photo., 2 tabs. (NACA TN 3254)

STARTING AND OPERATING LIMITS OF TWO SUPERSONIC WIND TUNNELS UTILIZING AUXILIARY AIR INJECTION DOWNSTREAM OF THE TEST SECTION. Henry R. Hunczak and Morris D. Rousso. September 1954. 28p. diags., photo. (NACA TN 3262)

USE OF A HOT-WIRE ANEMOMETER IN SHOCK-TUBE INVESTIGATIONS. Darshan Singh Dosanjh, Johns Hopkins University. December 1954. ii, 98p. diags., photos. (NACA TN 3163)

## Equipment

### (9.1)

DIRECT MEASUREMENTS OF SKIN FRICTION. Satish Dhawan, California Institute of Technology. 1953. ii, 20p. diags., photos. (NACA Rept. 1121. Formerly TN 2567)

APPLICATIONS OF AUXILIARY AIR INJECTORS TO SUPERSONIC WIND TUNNELS. Joseph M. Spiegel, Robert U. Hofstetter and Donald M. Kuehn. November 1953. 53p. diags., photos. (NACA RM A53101)

CONSIDERATIONS ON A LARGE HYDRAULIC JET CATAPULT. Upshur T. Joyner and Walter B. Horne. July 1954. 49p. diags., photos., tab. (NACA TN 3203. Formerly RM L51B27)

AN EVALUATION OF AN ACCELEROMETER METHOD FOR OBTAINING LANDING-GEAR DRAG LOADS. Jerome G. Theisen and Philip M. Edge, Jr. October 1954. 22p. diags., photos. (NACA TN 3247)

SHEARING-STRESS MEASUREMENTS BY USE OF A HEATED ELEMENT. H. W. Liepmann and G. T. Skinner, California Institute of Technology. November 1954. 27p. diags. (NACA TN 3268)

SOME MEASUREMENTS OF ATMOSPHERIC TURBULENCE OBTAINED FROM FLOW-DIRECTION VANES MOUNTED ON AN AIRPLANE. Robert G. Chilton. November 1954. 22p. diags., photo., tab. (NACA TN 3313)

FLIGHT TESTING BY RADIO REMOTE CONTROL - FLIGHT EVALUATION OF A BEEP-CONTROL SYSTEM. Howard L. Turner, John S. White and Rudolph D. Van Dyke, Jr. March 1955. 55p. diags., photos., tab. (NACA TN 3496. Formerly RM A52A29)

DESIGN AND PERFORMANCE OF THROTTLE-TYPE FUEL CONTROLS FOR ENGINE DYNAMIC STUDIES. Edward W. Otto, Harold Gold and Kirby W. Hiller. April 1955. 39p. diags., photo. (NACA TN 3445)

## WIND TUNNELS

### (9.1.1)

AN 8-FOOT AXISYMMETRICAL FIXED NOZZLE FOR SUBSONIC MACH NUMBERS UP TO 0.99 AND FOR A SUPERSONIC MACH NUMBER OF 1.2. Virgil S. Ritchie, Ray H. Wright and Marshall P. Tulin. February 23, 1950. 52p. diags., photos., 2 tabs. (NACA RM L50A03a)

INVESTIGATION OF PERFORATED CONVERGENT-DIVERGENT DIFFUSERS WITH INITIAL BOUNDARY LAYER. Maynard I. Weinstein. August 15, 1950. 26p. diags., photo. (NACA RM E50F12)

AERODYNAMIC CHARACTERISTICS AT A MACH NUMBER OF 1.38 OF FOUR WINGS OF ASPECT RATIO 4 HAVING QUARTER-CHORD SWEEP ANGLES OF 0°, 35°, 45°, AND 60°. William B. Kemp, Jr., Kenneth W. Goodson and Robert A. Booth. October 10, 1950. 41p. diags., photos., tab. (NACA RM L50G14)

APPARATUS FOR OBTAINING A SUPERSONIC FLOW OF VERY SHORT DURATION AND SOME DRAG MEASUREMENTS OBTAINED WITH ITS USE. John E. Yeates, Jr., F. J. Bailey, Jr. and T. J. Voglewede. July 23, 1951. 23p. diags., photos. (NACA RM L9C01)

EFFECT OF THICKNESS, CAMBER, AND THICKNESS DISTRIBUTION ON AIRFOIL CHARACTERISTICS AT MACH NUMBERS UP TO 1.0. Bernard N. Daley and Richard S. Dick. October 1952. 76p. photos., diags., tab. (NACA RM L52G31a)

CONSIDERATIONS ON THE EFFECT OF WIND-TUNNEL WALLS ON OSCILLATING AIR FORCES FOR TWO-DIMENSIONAL SUBSONIC COMPRESSIBLE FLOW. Harry L. Runyan and Charles E. Watkins. 1953. ii, 7p. diags. (NACA Rept. 1150. Formerly TN 2552)

APPLICATIONS OF AUXILIARY AIR INJECTORS TO SUPERSONIC WIND TUNNELS. Joseph M. Spiegel, Robert U. Hofstetter and Donald M. Kuehn. November 1953. 53p. diags., photos. (NACA RM A53101)

THE ZERO-LIFT DRAG OF A SLENDER BODY OF REVOLUTION (NACA RM-10 RESEARCH MODEL) AS DETERMINED FROM TESTS IN SEVERAL WIND TUNNELS AND IN FLIGHT AT SUPERSONIC SPEEDS. Albert J. Evans. 1954. ii, 13p. diags., tab. (NACA Rept. 1160. Formerly TN 2944)

CONVECTION OF A PATTERN OF VORTICITY THROUGH A SHOCK WAVE. H. S. Ribner. 1954. ii, 17p. diags. (NACA Rept. 1164. Formerly TN 2864)

AN ANALYSIS OF SHOCK-WAVE CANCELLATION AND REFLECTION FOR POROUS WALLS WHICH OBEY AN EXPONENTIAL MASS-FLOW PRESSURE-DIFFERENCE RELATION. Joseph M. Spiegel and Phillips J. Tunnell. August 1954. 23p. diags. (NACA TN 3223)

SOME POSSIBILITIES OF USING GAS MIXTURES OTHER THAN AIR IN AERODYNAMIC RESEARCH. Dean R. Chapman. August 1954. 48p. diags., 4 tabs. (NACA TN 3226)

INVESTIGATION OF MACH NUMBER CHANGES OBTAINED BY DISCHARGING HIGH-PRESSURE PULSE THROUGH WIND TUNNEL OPERATING SUPERSONICALLY. Rudolph C. Haefeli and Harry Bernstein. August 1954. 14p. diags., photos., tab. (NACA TN 3258)

KINETIC TREATMENT OF THE NUCLEATION IN SUPERSATURATED VAPORS. (Kinetische Behandlung der Keimbildung in übersättigten Dämpfen). R. Becker and W. Döring. September 1954. 43p. diags. (NACA TM 1374. Trans. from Annalen der Physik, Ser. 5, v. 24, 1935, p. 719-752).

STARTING AND OPERATING LIMITS OF TWO SUPERSONIC WIND TUNNELS UTILIZING AUXILIARY AIR INJECTION DOWNSTREAM OF THE TEST SECTION. Henry R. Hunczak and Morris D. Rouso. September 1954. 28p. diags., photo. (NACA TN 3262)



**Wind Tunnels (Cont.)**

INVESTIGATION OF LIFT, DRAG, AND PITCHING MOMENT OF A 60° DELTA-WING—BODY COMBINATION (AGARD CALIBRATION MODEL B) IN THE LANGLEY 9-INCH SUPERSONIC TUNNEL. August F. Bromm, Jr. September 1954. 18p. diags., photos. (NACA TN 3300)

LIQUEFACTION OF AIR IN THE LANGLEY 11-INCH HYPERSONIC TUNNEL. Charles H. McLellan and Thomas W. Williams. October 1954. 36p. diags., 4 tabs. (NACA TN 3302)

AN ACCURATE AND RAPID METHOD FOR THE DESIGN OF SUPERSONIC NOZZLES. Ivan E. Beckwith and John A. Moore. February 1955. 57p. diags., 3 tabs. (NACA TN 3322)

**FREE-FLIGHT****(9.1.2)**

FLIGHT INVESTIGATION OF THE JETTISONABLE-NOSE METHOD OF PILOT ESCAPE USING ROCKET-PROPELLED MODELS. Reginald R. Lundstrom and Burke R. O'Kelly. June 2, 1949. 27p. diags., photos., 2 tabs. (NACA RM L9D11)

FLIGHT CALIBRATION OF FOUR AIRSPEED SYSTEMS ON A SWEEP-WING AIRPLANE AT MACH NUMBERS UP TO 1.04 BY THE NACA RADAR-PHOTOTHEODOLITE METHOD. Jim Rogers Thompson, Richard S. Bray and George E. Cooper. October 27, 1950. 41p. diags., photos., tab. (NACA RM A50H24)

A COMPARISON OF TWO TECHNIQUES UTILIZING ROCKET-PROPELLED VEHICLES FOR THE DETERMINATION OF THE DAMPING-IN-ROLL DERIVATIVE. David G. Stone and Carl A. Sandahl. May 3, 1951. 17p. diags., photos. (NACA RM L51A16)

WIND-TUNNEL INVESTIGATION OF A SHIELDED TOTAL-PRESSURE TUBE AT TRANSONIC SPEEDS. William Gracey, Albin O. Pearson and Walter R. Russell. January 1952. 8p. diags. (NACA RM L51K19)

A PRELIMINARY INVESTIGATION OF SHOCK-WAVE REFLECTIONS IN A SMALL CLOSED BALLISTIC RANGE WITH VARIOUS TYPES OF WALLS. A. P. Sabol. September 1952. 21p. photos., diags. (NACA RM L52G25)

A METHOD OF CALIBRATING AIRSPEED INSTALLATIONS ON AIRPLANES AT TRANSONIC AND SUPERSONIC SPEEDS BY THE USE OF ACCELEROMETER AND ATTITUDE-ANGLE MEASUREMENTS. John A. Zalovcik, Lindsay J. Lina and James P. Trant, Jr. 1953. ii, 13p. diags., photos., tab. (NACA Rept. 1145. Formerly TN 2099; TN 2570)

THE ZERO-LIFT DRAG OF A SLENDER BODY OF REVOLUTION (NACA RM-10 RESEARCH MODEL) AS DETERMINED FROM TESTS IN SEVERAL WIND TUNNELS AND IN FLIGHT AT SUPERSONIC SPEEDS. Albert J. Evans. 1954. ii, 13p. diags., tab. (NACA Rept. 1160. Formerly TN 2944)

SOME POSSIBILITIES OF USING GAS MIXTURES OTHER THAN AIR IN AERODYNAMIC RESEARCH. Dean R. Chapman. August 1954. 48p. diags., 4 tabs. (NACA TN 3226)

A TECHNIQUE UTILIZING ROCKET-PROPELLED TEST VEHICLES FOR THE MEASUREMENT OF THE DAMPING IN ROLL OF STING-MOUNTED MODELS AND SOME INITIAL RESULTS FOR DELTA AND UNSWEPT TAPERED WINGS. William M. Bland, Jr. and Carl A. Sandahl. May 1955. 25p. diags., photos., tab. (NACA TN 3314. Formerly RM L50D24)

AN NACA VANE-TYPE ANGLE-OF-ATTACK INDICATOR FOR USE AT SUBSONIC AND SUPERSONIC SPEEDS. Jesse L. Mitchell and Robert F. Peck. May 1955. 8p. diags., photo. (NACA TN 3441. Formerly RM L9F28a)

**PROPULSION RESEARCH EQUIPMENT****(9.1.4)**

SOME POSSIBILITIES OF USING GAS MIXTURES OTHER THAN AIR IN AERODYNAMIC RESEARCH. Dean R. Chapman. August 1954. 48p. diags., 4 tabs. (NACA TN 3226)

SOME EFFECTS OF EXPOSURE TO EXHAUST-GAS STREAMS ON EMITTANCE AND THERMOELECTRIC POWER OF BARE-WIRE PLATINUM RHODIUM - PLATINUM THERMOCOUPLES. George E. Glawe and Charles E. Shepard. August 1954. 30p. diags., photos. (NACA TN 3253)

**PROPELLER****(9.1.5)**

INVESTIGATION OF THE NACA 4-(5)(08)-03 TWO-BLADE PROPELLER AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Melvin M. Carmel. September 15, 1949. 61p. diags., photo. (NACA RM L9G06a)

EFFECT OF COMPRESSIBILITY AND CAMBER AS DETERMINED FROM AN INVESTIGATION OF THE NACA 4-(3)(08)-03 AND 4-(5)(08)-03 TWO-BLADE PROPELLERS UP TO FORWARD MACH NUMBERS OF 0.925. Melvin M. Carmel, Francis G. Morgan, Jr. and Domenic A. Coppolino. June 29, 1950. 92p. diags., photo. (NACA RM L50D28)

INVESTIGATION OF AN NACA 4-(5)(05)-041 FOUR-BLADE PROPELLER WITH SEVERAL SPINNERS AT MACH NUMBERS UP TO 0.90. Robert M. Reynolds, Donald A. Buell and John H. Walker. December 1952. 86p. diags., photos., 6 tabs. (NACA RM A52119a)

**MATERIALS****(9.1.6)**

HIGH-RESOLUTION AUTORADIOGRAPHY. George C. Towe, Henry J. Gomberg and J. W. Freeman, University of Michigan. July 1954. ii, 138p. diags., photos., 9 tabs. (NACA TN 3209)

A FIBROUS-GLASS COMPACT AS A PERMEABLE MATERIAL FOR BOUNDARY-LAYER-CONTROL APPLICATIONS USING AREA SUCTION. Robert E. Dannenberg, James A. Weiberg and Bruno J. Gambucci. January 1955. 20p. diags., photos., 2 tabs. (NACA TN 3388)



## Technique (9.2)

HIGH-SPEED WIND-TUNNEL TESTS OF A 1/16-SCALE MODEL OF THE D-558 RESEARCH AIRPLANE - DYNAMIC PRESSURE AND COMPARISON OF POINT AND EFFECTIVE DOWNWASH AT THE TAIL OF THE D-558-1. Harold L. Robinson. November 4, 1948. 27p. diags. (NACA RM L8H05)

THEORETICAL ANALYSIS OF THE ROLLING MOTIONS OF AIRCRAFT USING A FLICKER-TYPE AUTOMATIC ROLL STABILIZATION SYSTEM HAVING A DISPLACEMENT-PLUS-RATE RESPONSE. Howard J. Curfman, Jr. January 12, 1949. 29p. diags., 2 tabs. (NACA RM L8K23a)

FLIGHT INVESTIGATION OF THE JETTISONABLE-NOSE METHOD OF PILOT ESCAPE USING ROCKET-PROPELLED MODELS. Reginald R. Lundstrom and Burke R. O'Kelly. June 2, 1949. 27p. diags., photos., 2 tabs. (NACA RM L9D11)

INVESTIGATION OF LIFT, DRAG, AND PITCHING MOMENT OF A 60° DELTA-WING-BODY COMBINATION (AGARD CALIBRATION MODEL B) IN THE LANGLEY 9-INCH SUPERSONIC TUNNEL. August F. Bromm, Jr. September 1954. 18p. diags., photos. (NACA TN 3300)

LIQUEFACTION OF AIR IN THE LANGLEY 11-INCH HYPERSONIC TUNNEL. Charles H. McLellan and Thomas W. Williams. October 1954. 36p. diags., 4 tabs. (NACA TN 3302)

AN EVALUATION OF NON-NEWTONIAN FLOW IN PIPE LINES. Ruth N. Weltmann. February 1955. 40p. diags., tab. (NACA TN 3397)

A THEORY FOR PREDICTING THE FLOW OF REAL GASES IN SHOCK TUBES WITH EXPERIMENTAL VERIFICATION. Robert L. Trimpi and Nathaniel B. Cohen. March 1955. 69p. diags., photo. (NACA TN 3375)

FLIGHT TESTING BY RADIO REMOTE CONTROL - FLIGHT EVALUATION OF A BEEP-CONTROL SYSTEM. Howard L. Turner, John S. White and Rudolph D. Van Dyke, Jr. March 1955. 55p. diags., photos., tab. (NACA TN 3496. Formerly RM A52A29)

### CORRECTIONS

#### (9.2.1)

INVESTIGATION OF THE NACA 4-(5)(08)-03 TWO-BLADE PROPELLER AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Melvin M. Carmel. September 15, 1949. 61p. diags., photo. (NACA RM L9G06a)

FLIGHT CALIBRATION OF FOUR AIRSPEED SYSTEMS ON A SWEEP-WING AIRPLANE AT MACH NUMBERS UP TO 1.04 BY THE NACA RADAR-PHOTOTHEODOLITE METHOD. Jim Rogers Thompson, Richard S. Bray and George E. Cooper. October 27, 1950. 41p. diags., photos., tab. (NACA RM A50H24)

ERROR IN AIRSPEED MEASUREMENT DUE TO STATIC-PRESSURE FIELD AHEAD OF THE WING TIP OF A SWEEP-WING AIRPLANE MODEL AT TRANSONIC SPEEDS. Edward C. B. Danforth and Thomas C. O'Bryan. March 1, 1951. 16p. diags., photo. (NACA RM L50L28)

A METHOD OF CALIBRATING AIRSPEED INSTALLATIONS ON AIRPLANES AT TRANSONIC AND SUPERSONIC SPEEDS BY THE USE OF ACCELEROMETER AND ATTITUDE-ANGLE MEASUREMENTS. John A. Zalovcik, Lindsay J. Lina and James P. Trant, Jr. 1953. ii, 13p. diags., photos., tab. (NACA Rept. 1145. Formerly TN 2099; TN 2570)

CONSIDERATIONS ON THE EFFECT OF WIND-TUNNEL WALLS ON OSCILLATING AIR FORCES FOR TWO-DIMENSIONAL SUBSONIC COMPRESSIBLE FLOW. Harry L. Runyan and Charles E. Watkins. 1953. ii, 7p. diags. (NACA Rept. 1150. Formerly TN 2552)

SOME EFFECTS OF EXPOSURE TO EXHAUST-GAS STREAMS ON EMITTANCE AND THERMOELECTRIC POWER OF BARE-WIRE PLATINUM RHODIUM - PLATINUM THERMOCOUPLES. George E. Glawe and Charles E. Shepard. August 1954. 30p. diags., photos. (NACA TN 3253)

VISCOSITY CORRECTIONS TO CONE PROBES IN RAREFIED SUPERSONIC FLOW AT A NOMINAL MACH NUMBER OF 4. L. Talbot, University of California. November 1954. 39p. diags., photo., 4 tabs. (NACA TN 3219)

GENERALIZATION OF GAS-FLOW-INTERFEROMETRY THEORY AND INTERFEROGRAM EVALUATION EQUATIONS FOR ONE-DIMENSIONAL DENSITY FIELDS. Walton L. Howes and Donald R. Buchele. February 1955. 70p. diags., photos. (NACA TN 3340)

AN NACA VANE-TYPE ANGLE-OF-ATTACK INDICATOR FOR USE AT SUBSONIC AND SUPERSONIC SPEEDS. Jesse L. Mitchell and Robert F. Peck. May 1955. 8p. diags., photo. (NACA TN 3441. Formerly RM L9F28a)

## AERODYNAMICS

#### (9.2.2)

INVESTIGATION OF THE NACA 4-(5)(08)-03 TWO-BLADE PROPELLER AT FORWARD MACH NUMBERS TO 0.925. James B. Delano and Melvin M. Carmel. September 15, 1949. 61p. diags., photo. (NACA RM L9G06a)

AN 8-FOOT AXISYMMETRICAL FIXED NOZZLE FOR SUBSONIC MACH NUMBERS UP TO 0.99 AND FOR A SUPERSONIC MACH NUMBER OF 1.2. Virgil S. Ritchie, Ray H. Wright and Marshall P. Tulin. February 23, 1950. 52p. diags., photos., 2 tabs. (NACA RM L50A03a)

SUPERSONIC TUNNEL INVESTIGATION BY MEANS OF INCLINED-PLATE TECHNIQUE TO DETERMINE PERFORMANCE OF SEVERAL NOSE INLETS OVER MACH NUMBER RANGE OF 1.72 TO 2.18. Jerome L. Fox. February 14, 1951. 27p. diags., photos. (NACA RM E50K14)

SKIN-TEMPERATURE TELEMETER FOR DETERMINING BOUNDARY-LAYER HEAT-TRANSFER COEFFICIENTS. Clifford L. Fricke and Francis B. Smith. March 15, 1951. 22p. diags. (NACA RM L50J17)



## Aerodynamics (Cont.)

PRELIMINARY INVESTIGATION OF THE DRAG CHARACTERISTICS OF THE NACA RM-10 MISSILE AT MACH NUMBERS OF 1.40 AND 1.59 IN THE LANGLEY 4-BY 4-FOOT SUPERSONIC TUNNEL. Lowell E. Hasel, Archibald R. Sinclair and Clyde V. Hamilton, April 1952. 49p. diagrs., photos, 3 tabs. (NACA RM L52A14)

A PRELIMINARY INVESTIGATION OF SHOCK-WAVE REFLECTIONS IN A SMALL CLOSED BALLISTIC RANGE WITH VARIOUS TYPES OF WALLS. A. P. Sabol. September 1952. 21p. photos., diagrs. (NACA RM L52G25)

DIRECT MEASUREMENTS OF SKIN FRICTION. Satish Dhawan, California Institute of Technology. 1953. ii, 20p. diagrs., photos. (NACA Rept. 1121. Formerly TN 2567)

A VISUALIZATION STUDY OF SECONDARY FLOWS IN CASCADES. Howard Z. Herzig, Arthur G. Hansen and George R. Costello. 1954. ii, 51p. diagrs., photos. (NACA Rept. 1163. Formerly TN 2947; RM E52F19)

INVESTIGATION OF MACH NUMBER CHANGES OBTAINED BY DISCHARGING HIGH-PRESSURE PULSE THROUGH WIND TUNNEL OPERATING SUPERSONICALLY. Rudolph C. Haefeli and Harry Bernstein. August 1954. 14p. diagrs., photos., tab. (NACA TN 3258)

RECOVERY CORRECTIONS FOR BUTT-WELDED, STRAIGHT-WIRE THERMOCOUPLES IN HIGH-VELOCITY, HIGH-TEMPERATURE GAS STREAMS. Frederick S. Simmons. September 1954. 19p. diagrs. (NACA RM E54G22a)

A PRELIMINARY FLIGHT INVESTIGATION OF AN OIL-FLOW TECHNIQUE FOR AIR-FLOW VISUALIZATION. Harold I. Johnson and Robert G. Mungall. October 1954. 33p. diagrs., photos. (NACA RM L54G14a)

SMOKE STUDY OF NOZZLE SECONDARY FLOWS IN A LOW-SPEED TURBINE. Milton G. Kofskey and Hubert W. Allen. November 1954. 24p. diagrs., photos. (NACA TN 3260)

A SYSTEM FOR MEASURING THE DYNAMIC LATERAL STABILITY DERIVATIVES IN HIGH-SPEED WIND TUNNELS. Henry C. Lessing, Thomas B. Fryer and Merrill H. Mead. December 1954. 42p. diagrs., photo. (NACA TN 3348)

A WIND-TUNNEL TEST TECHNIQUE FOR MEASURING THE DYNAMIC ROTARY STABILITY DERIVATIVES INCLUDING THE CROSS DERIVATIVES AT HIGH MACH NUMBERS. Benjamin H. Beam. January 1955. 35p. diagrs., photos. (NACA TN 3347)

THE LINEARIZED EQUATIONS OF MOTION UNDERLYING THE DYNAMIC STABILITY OF AIRCRAFT, SPINNING PROJECTILES, AND SYMMETRICAL MISSILES. A. C. Charters. January 1955. 102p. diagrs. (NACA TN 3350)

SOME MEASUREMENTS OF TIME AND SPACE CORRELATION IN WIND TUNNEL. (Quelques Mesures de Correlation Dans le Temps et L'Espace en Soufflerie). A. Favre, J. Gaviglio and R. Dumas. February 1955. 21p. diagrs. (NACA TM 1370. Trans. from La Recherche Aeronautique, no. 32, Mar.-Apr., 1953, p. 21-28).

GENERALIZATION OF GAS-FLOW-INTERFEROMETRY THEORY AND INTERFEROGRAM EVALUATION EQUATIONS FOR ONE-DIMENSIONAL DENSITY FIELDS. Walton L. Howes and Donald R. Buchele. February 1955. 70p. diagrs., photos. (NACA TN 3340)

APPARATUS FOR MEASUREMENTS OF TIME AND SPACE CORRELATION. (Appareil de Mesures de la Correlation Dans le Temps et L'Espace). A. Favre, J. Gaviglio and R. Dumas. (Presented at eighth International Congress for Theoretical and Applied Mechanics, Istanbul, Aug., 1952) April 1955. 20p. diagrs., photos. (NACA TM 1371. Trans. from La Recherche Aeronautique, no. 31, Jan.-Feb., 1953, p. 37-44).

A SELF-EXCITED, ALTERNATING-CURRENT, CONSTANT-TEMPERATURE HOT-WIRE ANEMOMETER. Charles E. Shepard. April 1955. 29p. diagrs., photos. (NACA TN 3406)

METHOD OF CONTROLLING STIFFNESS PROPERTIES OF A SOLID-CONSTRUCTION MODEL WING. Norman S. Land and Frank T. Abbott, Jr. April 1955. 21p. diagrs., photos., tab. (NACA TN 3423)

HEAT-LOSS CHARACTERISTICS OF HOT-WIRE ANEMOMETERS AT VARIOUS DENSITIES IN TRANSONIC AND SUPERSONIC FLOW. W. G. Spangenberg, National Bureau of Standards. May 1955. 82p. diagrs., photos., 14 tabs. (NACA TN 3381)

## HYDRODYNAMICS (9.2.3)

AVERAGE SKIN-FRICTION DRAG COEFFICIENTS FROM TANK TESTS OF A PARABOLIC BODY OF REVOLUTION (NACA RM-10). Elmo J. Mottard and J. Dan Lopper. 1954. ii, 7p. diagrs., photos. (NACA Rept. 1161. Formerly TN 2854)

## LOADS AND CONSTRUCTION (9.2.4)

AN INVESTIGATION OF THE USE OF ROCKET-POWERED MODELS FOR GUST-LOAD STUDIES WITH AN APPLICATION TO A TAILLESS SWEEP-WING MODEL AT TRANSONIC SPEEDS. A. James Vitale, H. Press and C. C. Shuffelbarger. June 1954. 36p. diagrs., photos., tab. (NACA TN 3161)

AN EVALUATION OF AN ACCELEROMETER METHOD FOR OBTAINING LANDING-GEAR DRAG LOADS. Jerome G. Theisen and Philip M. Edge, Jr. October 1954. 22p. diagrs., photos. (NACA TN 3247)

METHOD OF CONTROLLING STIFFNESS PROPERTIES OF A SOLID-CONSTRUCTION MODEL WING. Norman S. Land and Frank T. Abbott, Jr. April 1955. 21p. diagrs., photos., tab. (NACA TN 3423)

## PROPULSION (9.2.5)

THE EFFECTIVENESS OF WING VORTEX GENERATORS IN IMPROVING THE MANEUVERING CHARACTERISTICS OF A SWEEP-WING AIRPLANE AT TRANSONIC SPEEDS. Norman M. McFadden, George A. Rathert, Jr. and Richard S. Bray. February 1952. 45p. photos., diagrs., tab. (NACA RM A51J18)

A SELF-EXCITED, ALTERNATING-CURRENT, CONSTANT-TEMPERATURE HOT-WIRE ANEMOMETER. Charles E. Shepard. April 1955. 29p. diagrs. photos. (NACA TN 3406)

## OPERATING PROBLEMS

### (9.2.6)

APPLICATIONS OF AUXILIARY AIR INJECTORS TO SUPERSONIC WIND TUNNELS. Joseph M. Spiegel, Robert U. Hofstetter and Donald M. Kuehn. November 1953. 53p. diagrs., photos. (NACA RM A53101)

A PROCEDURE FOR THE DESIGN OF AIR-HEATED ICE-PREVENTION SYSTEMS. Carr B. Neel, Jr. June 1954. 63p. diagrs., photo. (NACA TN 3130)

AN ANALYSIS OF SHOCK-WAVE CANCELLATION AND REFLECTION FOR POROUS WALLS WHICH OBEY AN EXPONENTIAL MASS-FLOW PRESSURE-DIFFERENCE RELATION. Joseph M. Spiegel and Phillips J. Tunnell. August 1954. 23p. diagrs. (NACA TN 3223)

STARTING AND OPERATING LIMITS OF TWO SUPERSONIC WIND TUNNELS UTILIZING AUXILIARY AIR INJECTION DOWNSTREAM OF THE TEST SECTION. Henry R. Hunczak and Morris D. Rouso. September 1954. 28p. diagrs., photo. (NACA TN 3262)

## MATHEMATICS

### (9.2.7)

THEORETICAL INVESTIGATION OF AN AUTOMATIC CONTROL SYSTEM WITH PRIMARY SENSITIVITY TO NORMAL ACCELERATIONS AS USED TO CONTROL A SUPERSONIC CANARD MISSILE CONFIGURATION. Ernest C. Seaberg and Earl F. Smith. July 1951. 48p. diagrs., photo., 3 tabs. (NACA RM L51D23)

SYSTEM ANALYSES AND AUTOPILOT DESIGN FOR AUTOMATIC ROLL STABILIZATION OF A SUPERSONIC PILOTLESS AIRCRAFT. Jacob Zarovsky. July 1951. 55p. diagrs., tab. (NACA RM L51E07)

LONGITUDINAL FREQUENCY-RESPONSE CHARACTERISTICS OF A 35° SWEEP-WING AIRPLANE AS DETERMINED FROM FLIGHT MEASUREMENTS, INCLUDING A METHOD FOR THE EVALUATION OF TRANSFER FUNCTIONS. William C. Triplett and G. Allan Smith. September 1951. 45p. diagrs., photo. (NACA RM A51G27)

A THEORETICAL INVESTIGATION OF THE INFLUENCE OF AUTOPILOT NATURAL FREQUENCY UPON THE DYNAMIC PERFORMANCE CHARACTERISTICS OF A SUPERSONIC CANARD MISSILE CONFIGURATION WITH A PITCH-ATTITUDE CONTROL SYSTEM. Anthony L. Passera. October 1951. 32p. diagrs., photos., 2 tabs. (NACA RM L51H02)

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THE SMALL-DISTURBANCE METHOD FOR FLOW OF A COMPRESSIBLE FLUID WITH VELOCITY POTENTIAL AND STREAM FUNCTION AS INDEPENDENT VARIABLES. Carl Kaplan. August 1954. 18p. (NACA TN 3229)

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THEORETICAL INVESTIGATION OF A PROPORTIONAL-PLUS-FLICKER AUTOMATIC PILOT. Ernest C. Seaberg. May 1955. 53p. diagrs., photo., tab. (NACA TN 3427. Formerly RM L50I19)



ALPHABETICAL SUBJECT INDEX

<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>	<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>
A			
Accessories and Accessory Functions	(3. 12)	Aeroelasticity	(1. 9)
See also		Aeroelasticity, Loads	(4. 1. 1. 5)
Cooling Systems		Afterburning, Gas Turbines	(3. 3. 2. 2)
Fuel Systems		Ailerons, Vibration and Flutter	(4. 2. 1)
Ignition Systems		Air Inlets	
Accessories Ice Prevention and Removal	(7. 3. 5)	See	
Adhesives	(5. 1. 8)	Inlets	
Aerodynamic Loads	(4. 1. 1)	Air Brakes	(1. 8. 2. 4)
See also		Aircraft	(1. 7)
Aerodynamic Loads - Fuselage, Nacelles, and Canopies		See also	
Aerodynamic Loads, Rotating Wings		Airplanes	
Aerodynamic Loads, Tail		Missiles	
Aerodynamic Loads, Wings		Rotating-Wing Aircraft	
Aeroelasticity		Seaplanes	
Aerodynamic Loads - Fuselage, Nacelles, and Canopies	(4. 1. 1. 3)	Aircraft Construction	
Aerodynamic Loads, Rotating Wings	(4. 1. 1. 4)	See	
Aerodynamic Loads, Tail	(4. 1. 1. 2)	Aircraft Loads and Construction	
See also		Aircraft Loads and Construction	(4)
Buffeting and Gust Loads, Tail		See also	
Maneuvering Loads, Tail		Loads	
Steady Loads, Tail		Structures	
Aerodynamic Loads, Wings	(4. 1. 1. 1)	Vibration and Flutter	
See also		Airplane Performance	(1. 7. 1. 3)
Gust Loads, Wings		Airplanes	(1. 7. 1)
Maneuvering Loads, Wings		See also	
Steady Loads, Wings		Airplanes, Specific Types	
Aerodynamics	(1)	Components in Combination	
See also		Performance, Airplanes	
Aerodynamics, Fundamental		Airplanes, Specific Types	(1. 7. 1. 2)
Aeroelasticity		All-Movable Controls, Complete Wings	(1. 2. 2. 4. 3)
Aircraft		Aluminum	(5. 1. 1)
Bodies		Amphibians	
Internal Aerodynamics		See	
Parachutes		Hydrodynamics	
Propellers		Antifriction Bearings	(3. 8. 3. 1)
Rotating Wings		Aspect Ratio, Complete Wings	(1. 2. 2. 2. 2)
Stability and Control, Aerodynamic Wings		Atmosphere	(6. 1)
Aerodynamics, Fundamental	(1. 1)	See also	
See also		Gusts	
Aerodynamics With Heat		Atomization, Fuel	
Compressible Flow		See	
Flow of Rarefied Gases		Combustion, Effects of Fuel Atomization	
Incompressible Flow		Fuels, Physical and Chemical Properties	
Viscous Flow		Autogiros	(1. 7. 3. 1)
Aerodynamics With Heat	(1. 1. 4)	Automatic Control, Aerodynamic	(1. 8. 2. 6)
See also		Automatic Stabilization	(1. 8. 8)
Heat, Addition of - Aerodynamic		Auxiliary Booster Systems	(3. 3)
Heat Transfer, Aerodynamic		See also	
Heating, Aerodynamic		Gas Turbines, Auxiliary Booster Systems	
Aerodynamics, Internal		Axial-Flow Compressors	(3. 6. 1. 1)
See		Axial-Flow Turbines	(3. 7. 1. 1)
Internal Aerodynamics		B	
Aerodynamics Research Technique	(9. 2. 2)	Beams, Structural	(4. 3. 4)
		See also	
		Box Beams	



<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>	<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>
Bearings			
See			
Antifriction Bearings			
Bending, Structural	(4.3.7.3)		
Bends, Internal Aerodynamics	(1.4.2.4)		
Blade Plan Forms, Propellers	(1.5.2.4)		
Blade Sections, Propellers	(1.5.2.1)		
Bodies	(1.3)		
See also			
Bodies, Theory			
Canopies			
Ducted Bodies			
Hulls			
Shape Variables, Bodies			
Bodies, Theory	(1.3.1)		
Body-Wing Combinations, Missiles	(1.7.2.1.1)		
Bolted Connections	(4.3.6.1)		
Booster Systems, Auxiliary			
See			
Auxiliary Booster Systems			
Booster Systems, Auxiliary - Gas			
Turbines			
See			
Gas Turbines, Auxiliary Booster			
Systems			
Boundary Layer Characteristics,			
Complete Wings	(1.2.2.8.1)		
Boundary Layer Characteristics -			
Internal Aerodynamics	(1.4.7.1)		
Boundary Layer Characteristics, Wing			
Sections	(1.2.1.6.1)		
Boundary Layer, Complete Wings	(1.2.2.8)		
See also			
Boundary Layer Characteristics,			
Complete Wings			
Boundary Layer Control, Complete			
Wings			
Boundary Layer Control, Complete			
Wings	(1.2.2.8.2)		
Boundary Layer Control, Internal			
Aerodynamics	(1.4.7.2)		
Boundary Layer Control, Wing			
Sections	(1.2.1.6.2)		
Boundary Layer, Internal Aerodynamics	(1.4.7)		
See also			
Boundary Layer Characteristics,			
Internal Aerodynamics			
Boundary Layer Control, Internal			
Aerodynamics			
Boundary Layer, Wing Sections	(1.2.1.6)		
See also			
Boundary Layer Characteristics,			
Wing Sections			
Boundary Layer Control, Wing			
Sections			
Box Beams	(4.3.4.1)		
Boxes, Structural	(4.3.5.2)		
Buffeting and Gust Loads, Tail	(4.1.1.2.3)		
		C	
		Camber, Wing Section	(1.2.1.2.1)
		Canopies	(1.3.3)
		Canopy Loading	
		See	
		Loads, Fuselage, Nacelle, and	
		Canopy	
		Cascades, Experiment	(1.4.5.2)
		Cascades, Internal Aerodynamics	(1.4.5)
		See also	
		Cascades, Experiment	
		Cascades, Theory	
		Cascades, Theory	(1.4.5.1)
		Centrifugal Compressors	
		See	
		Radial Flow Compressors	
		Ceramals	(5.1.12)
		Ceramics	(5.1.5)
		Chemistry of Lubrication	(3.8.1.2)
		Chines, Seaplane Hulls	(2.3.6)
		Columns, Structural	(4.3.1)
		Combustion and Combustors	(3.5)
		See also	
		Combustion Research, General	
		Combustion, Effect of Engine Operating	
		Conditions and Combustion-Chamber	
		Geometry	(3.5.2)
		See also	
		Ramjet Engines, Combustion	
		Rocket Engines, Combustion	
		Turbine Engines, Combustion	
		Combustion, Effects of Fuel Atomization	(3.5.1.4)
		Combustion - Relation to Specific Engine	
		Types	
		See	
		Combustion, Effect of Engine	
		Operating Conditions and	
		Combustion-Chamber Geometry	
		Combustion Research, General	(3.5.1)
		See also	
		Fuel Atomization, Effects on	
		Combustion	
		Ignition of Gases	
		Laminar-Flow Combustion	
		Reaction Mechanisms	
		Turbulent-Flow Combustion	
		Components in Combination, Airplanes	(1.7.1.1)
		See also	
		External Stores, Effects - Airplanes	
		Tail-Wing-Fuselage Combinations -	
		Airplanes	
		Wing-Fuselage Combinations, Airplanes	
		Wing-Nacelle Combinations, Airplanes	
		Components in Combination, Missiles	(1.7.2.1)
		See also	
		Interference, Jet - Missiles	





<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>	<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>
Dynamic Loads and Stresses	(4.3.7.7)	Flight Operations	
See also		See	
Repeated Dynamic Loads and Stresses		Operating Problems	
Transient Dynamic Loads and Stresses		Flow of Rarefied Gases	(1.1.5)
Dynamic Stability	(1.8.1.2)	Flutter and Vibration	
See also		See	
Damping Derivatives, Stability		Vibration and Flutter	
Lateral and Directional Stability, Dynamic		Flying Boats	
Longitudinal Stability, Dynamic		See	
		Hydrodynamics	
		Flying Qualities	(1.8.5)
		Frames, Gridworks, and Trusses	(4.3.2)
		Free-Flight Research Equipment	(9.1.2)
		Friction and Lubrication	(3.8)
		See also	
		Friction and Lubrication Theory and Experiment	
		Lubricants	
		Rolling Contact Surfaces	
		Sliding Contact Surfaces	
		Sliding and Rolling Contact Surfaces	
		Friction and Lubrication Theory and Experiment	(3.8.1)
		See also	
		Chemistry of Lubrication	
		Hydrodynamic Theory of Lubrication	
		Surface Conditions, Friction and Lubrication	
		Fuel Atomization, Effects on Combustion	(3.5.1.4)
		Fuel Systems	(3.12.1)
		See also	
		Fuel Systems, Rocket Engines	
		Fuel Systems, Rocket Engines	(3.12.1.8)
		Fuels	(3.4)
		See also	
		Fuels, Physical and Chemical Properties	
		Fuels, Relation to Engine Performance	
		Fuels, Physical and Chemical Properties	(3.4.2)
		Fuels, Relation to Engine Performance	(3.4.3)
		See also	
		Fuels - Rockets (Includes Fuel and Oxidant)	
		Fuels - Turbine Engines, Ram Jets, and Pulse Jets	
		Fuels - Rockets (Includes Fuel and Oxidant)	(3.4.3.3)
		Fuels - Turbine Engines, Ram Jets, and Pulse Jets	(3.4.3.2)
		Fuselage Loading	
		See	
		Loads, Fuselage, Nacelle, and Canopy	
		Fuselage-Wing Combinations, Airplanes	(1.7.1.1.1)
		Fuselage-Wing-Tail Combinations - Airplanes	(1.7.1.1.3)
E			
Engine Types, Comparisons	(3.1.12)		
Engines			
See			
Propulsion Systems, Complete			
Exhaust Energy Recovery, Reciprocating Engines			
See			
Reciprocating Engines With Turbines			
Exits and Inlets, Wing Sections	(1.2.1.2.4)		
Exits, Internal Aerodynamics	(1.4.3)		
External Stores, Effects - Airplanes	(1.7.1.1.5)		
F			
Fans, Vibration and Flutter	(4.2.4)		
Fatigue Properties of Materials	(5.2.5)		
Fineness Ratio, Bodies	(1.3.2.1)		
Fire Hazards	(7.9)		
Fire Prevention			
See			
Safety, Operations			
Flap-Type Controls, Complete Wings	(1.2.2.4.1)		
Flap-Type Controls, Wing Sections	(1.2.1.5.1)		
Flaps, Leading-Edge - Complete Wings	(1.2.2.3.3)		
Flaps, Leading-Edge - Wing Sections	(1.2.1.4.4)		
Flaps, Plain - Wing Sections	(1.2.1.4.1)		
Flaps, Split - Wing Sections	(1.2.1.4.2)		
Flaps, Trailing-Edge - Complete Wings	(1.2.2.3.1)		
Flat Plates, Stiffened	(4.3.3.1.2)		
Flat Plates, Structural	(4.3.3.1)		
See also			
Flat Plates, Stiffened			
Flat Plates, Unstiffened			
Flat Plates, Unstiffened	(4.3.3.1.1)		
Flexural Properties of Materials	(5.2.7)		
Flight Instruments	(8.1)		





Subject Heading Outline	Subject Heading Number	Subject Heading Outline	Subject Heading Number
Inlets, Side		L	
Inlets, Wing-Leading-Edge		Laboratory Instruments	(8.2)
Inlets, Central - Propeller-Spinner-Cowl	(1.4.1.1.1)	Laminar Flow	(1.1.3.1)
Inlets, Central - Subsonic	(1.4.1.1.2)	Laminar-Flow Combustion	(3.5.1.1)
Inlets, Central - Supersonic	(1.4.1.1.3)	Laminated Materials	(5.1.11)
Inlets and Exits, Wing Sections	(1.2.1.2.4)	Landing Loads	(4.1.2)
Inlets, Nose - Annular	(1.4.1.2)	See also	
Inlets, Nose - Central	(1.4.1.1)	Loads, Landing - Ground-Run	
See also		Loads, Landing - Impact	
Inlets, Central - Propeller-Spinner-Cowl		Prelanding Conditions	
Inlets, Central - Subsonic		Lateral Control	(1.8.2.2)
Inlets, Central - Supersonic		Lateral and Directional Stability, Dynamic	(1.8.1.2.2)
Inlets, Side	(1.4.1.4)	Lateral Stability, Static	(1.8.1.1.2)
See also		Length-Beam Ratio, Seaplane Hulls	(2.3.1)
Scoops		Liquid Injection, Gas Turbines	(3.3.2.1)
Submerged Inlets		Loads	(4.1)
Inlets, Wing-Leading-Edge	(1.4.1.3)	See also	
Instruments	(8)	Aerodynamic Loads	
See also		Landing Loads	
Flight Instruments		Loads and Construction, Research Technique	(9.2.4)
Laboratory Instruments		Loads and Stresses, Structural	(4.3.7)
Meteorological Instruments		See also	
Interference, Jet - Missiles	(1.7.2.1.3)	Bending in Structures	
Interference of Bodies, Propellers	(1.5.2.8)	Compression in Structures	
Intermittent Ramjet		Concentrated Loads and Stresses	
See		Dynamic Loads and Stresses	
Pulse Jet Engines		Normal Pressures	
Internal Aerodynamics	(1.4)	Shear in Structures	
See also		Torsion in Structures	
Boundary Layer, Internal Aerodynamics		Loads, Fuselage, Nacelle and Canopy	(4.1.1.3)
Cascades, Internal Aerodynamics		Loads, Landing - Ground-Run	(4.1.2.2)
Ducts, Internal Aerodynamics		See also	
Exits, Internal Aerodynamics		Loads, Landing - Ground-Run, Land	
Inlets		Loads, Landing - Ground-Run, Land	(4.1.2.2.1)
Pumps, Jet and Thrust Augmentors		Loads, Landing - Impact	(4.1.2.1)
J		See also	
Jet-Driven Rotors	(8.1.9)	Loads, Landing - Impact, Land	
Jet Engine Fuels		Loads, Landing - Impact, Water	
See		Loads, Landing - Impact, Land	(4.1.2.1.1)
Pulse Jet Engines, Fuels		Loads, Landing - Impact, Water	(4.1.2.1.2)
Ramjet Engines, Fuels		Loads, Tail	(4.1.1.2)
Rocket Fuels		See also	
Turbine Engines, Fuels		Buffeting and Gust Loads, Tail	
Jet Mixing	(1.1.3.3)	Maneuvering Loads, Tail	
Jet Propulsion Engines		Steady Loads, Tail	
See		Loads, Wing	(4.1.1.1)
Propulsion Systems, Complete		See also	
K		Gust Loads, Wing	
Kinetic Properties of Gases	(3.11.1)	Maneuvering Loads, Wing	
		Steady Loads, Wing	
		Longitudinal Control	(1.8.2.1)
		Longitudinal Stability and Control, Hydrodynamic	(2.10.1)
		Longitudinal Stability, Dynamic	(1.8.1.2.1)







<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>	<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>
Loads and Construction Research Technique		Inlets and Exits, Wing Sections	
Mathematics Research Technique		Surface Conditions, Wing Sections	
Operating Problems Research Technique		Thickness, Wing Sections	
Propulsion Research Technique		Thickness Distribution, Wing Sections	
Reynolds Number Effects, Complete Wings	(1.2.2.5)	Sections, Wing	
Reynolds Number Effects - Wing Sections	(1.2.1.7)	See	
Riveted Connections	(4.3.6.2)	Wing Sections	
Rocket Engines	(3.1.8)	Shape Variables, Bodies	(1.3.2)
Rocket Engines, Combustion	(3.5.2.5)	See also	
Rocket Fuels	(3.4.3.3)	Cross Section, Bodies	
Rockets		Fineness Ratio, Bodies	
See		Protuberances, Bodies	
Rocket Engines		Surface Conditions, Bodies	
Rolling Contact Surfaces	(3.8.3)	Thickness Distribution, Bodies	
See also		Shear Properties of Material	(5.2.6)
Antifriction Bearings		Shear in Structures	(4.3.7.5)
Rotating-Wing Aircraft	(1.7.3)	Shells, Structural	(4.3.5)
See also		See also	
Autogiros		Cylinders, Structural	
Helicopters		Side Exits, Ducted Bodies	(1.3.4.4)
Rotating Wing Loading	(4.1.1.4)	Side Inlets, Ducted Bodies	(1.3.4.3)
Rotating Wing Theory	(1.6.1)	Sleeve Bearings	(3.8.2.1)
Rotating Wings	(1.6)	Sliding Contact Surfaces	(3.8.2)
See also		See also	
Rotating Wing Theory		Sleeve Bearings	
Rotating Wings, Experimental Studies		Sliding and Rolling Contact Surfaces	(3.8.4)
Rotating Wings, Experimental Studies	(1.6.2)	Slipstream, Propellers	(1.5.4)
See also		Slots and Slats, Complete Wings	(1.2.2.3.2)
Rotating Wings, Power Driven		Spinning	(1.8.3)
Rotating Wings, Power Driven	(1.6.2.1)	Spoilers, Controls - Complete Wings	(1.2.2.4.2)
Rotors, Jet-Driven	(3.1.9)	Spoilers, Controls - Wing Sections	(1.2.1.5.2)
		Stability, Aerodynamic	(1.8.1)
S		See also	
Safety, Operations	(7.1)	Dynamic Stability	
See also		Static Stability	
Pilot-Escape Techniques		Stability and Control, Aerodynamic	(1.8)
Sandwich Materials	(5.1.11)	See also	
Scoops	(1.4.1.4.1)	Automatic Stabilization	
Seaplane Hull Variables	(2.3)	Control, Aerodynamic	
See also		Flying Qualities	
Chines, Seaplane Hulls		Mass and Gyroscopic Problems, Aerodynamic	
Deadrise, Seaplane Hulls		Spinning	
Length-Beam Ratio, Seaplane Hulls		Stability, Aerodynamic	
Steps, Seaplane Hulls		Stalling	
Seaplanes	(1.7.4)	Tumbling	
See also		Stability and Control, Hydrodynamic	(2.10)
General Studies, Seaplanes		See also	
Section Theory		Longitudinal Stability and Control, Hydrodynamic	
See		Stalling	(1.8.4)
Wing Section Theory		Static Stability	(1.8.1.1)
Section Variables, Wing Sections	(1.2.1.2)	See also	
See also		Directional Stability, Static	
Camber, Wing Sections		Lateral Stability, Static	
		Longitudinal Stability, Static	
		Steady Loads, Tail	(4.1.1.2.1)
		Steady Loads, Wing	(4.1.1.1.1)



<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>	<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>
Steels	(5.1.3)	Trusses, Frames, and Gridworks	(4.3.2)
Steps, Seaplane Hulls	(2.3.3)	Tumbling	(1.8.7)
Strain Gages		Turbine Blade Materials	
See		See	
Instruments		Ceramics	
Stress-Rupture Properties of		Heat-Resisting Alloys	
Materials	(5.2.4)	Protective Coatings	
Stress and Vibration, Compressors	(3.6.2)	Steels	
Stress and Vibration, Turbines	(3.7.3)	Turbine Cooling	(3.7.2)
Stresses and Loads, Structural		Turbine Disk Materials	
See		See	
Loads and Stresses, Structural		Heat-Resisting Alloys	
Structural Properties of Materials	(5.2.9)	Steels	
Structures	(4.3)	Turbine Engines	
See also		See	
Beams, Structural		Propulsion Systems, Complete	
Columns, Structural		Turbine Engines, Combustion	(3.5.2.2)
Connections, Structural		Turbine Engines, Fuels	(3.4.3.2)
Frames, Gridworks, and Trusses		Turbine Flow Theory and Experiment	(3.7.1)
Loads and Stresses, Structural		See also	
Plates, Structural		Axial-Flow Turbines	
Shells, Structural		Radial-Flow Turbines	
Submerged Inlets	(1.4.1.4.2)	Turbine-Propeller Engines, Control	(3.2.4)
Subsonic Diffusers	(1.4.2.1.1)	Turbine-Ram-Jet Engines, Control	(3.2.3)
Subsonic Flow	(1.1.2.1)	Turbines	(3.7)
Supersonic Diffusers	(1.4.2.1.2)	See also	
Supersonic Flow	(1.1.2.3)	Matching, Turbines	
Surface Conditions, Bodies	(1.3.2.4)	Stress and Vibration, Turbines	
Surface Conditions, Complete Wings	(1.2.2.2.6)	Turbine Cooling	
Surface Conditions, Friction and		Turbine Flow Theory and Experiment	
Lubrication	(3.8.1.3)	Turbo-Propeller Engines	(3.1.4)
Surface Conditions, Wing Sections	(1.2.1.2.5)	Turbojet Engines	(3.1.3)
Surface Craft	(2.8)	Turbojet Engines, Control	(3.2.2)
Sweep, Complete Wings	(1.2.2.2.3)	Turbulent Flow	(1.1.3.2)
		Turbulent-Flow Combustion	(3.5.1.2)
T		V	
Tail-Body Combinations, Missiles	(1.7.2.1.2)	Vibration and Flutter	(4.2)
Tail Loads		See also	
See		Vibration and Flutter, Bodies	
Loads, Tail		Vibration and Flutter - Propellers,	
Tail-Wing-Fuselage Combinations -		Fans and Compressors	
Airplanes	(1.7.1.1.3)	Vibration and Flutter - Rotating-	
Taper and Twist, Complete Wings	(1.2.2.2.4)	Wing Aircraft	
Tensile Properties of Materials	(5.2.1)	Vibration and Flutter, Tails	
Thermal Properties of Materials	(5.2.11)	Vibration and Flutter, Wings and	
Thermodynamic Properties of Gases	(3.11.2)	Ailerons	
Thickness, Wing Sections	(1.2.1.2.2)	Vibration and Flutter, Bodies	(4.2.3)
Thickness Distribution, Bodies	(1.3.2.3)	Vibration and Flutter - Elevators and	
Thickness Distribution, Wing Sections	(1.2.1.2.3)	Rudders	(4.2.2.1)
Thrust Augmentation		Vibration and Flutter - Propellers,	
See		Fans and Compressors	(4.2.4)
Auxiliary Booster Systems		Vibration and Flutter, Propulsion	(3.13)
Thrust Augmentors and Pumps, Jet	(1.4.4)	Vibration and Flutter - Rotating-	
Torsion in Structures	(4.3.7.4)	Wing Aircraft	(4.2.5)
Transient Dynamic Loads and		Vibration and Flutter, Tails	(4.2.2)
Stresses	(4.3.7.7.2)		

<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>	<u>Subject Heading Outline</u>	<u>Subject Heading Number</u>
See also		Wing-Tail-Body Combinations, Missiles	(1.7.2.1.4)
Vibration and Flutter, Elevators and Rudders		Wing-Tail-Fuselage Combinations - Airplanes	(1.7.1.1.3)
Vibration and Flutter, Wings and Ailerons	(4.2.1)	Wing Theory, Complete Wings	(1.2.2.1)
Vibration and Stress, Compressors	(3.6.2)	Wing Variables, Complete Wings	(1.2.2.2)
Vibration and Stress, Turbines	(3.7.3)	See also	
Viscous Flow	(1.1.3)	Aspect Ratio, Complete Wings	
See also		Dihedral, Complete Wings	
Jet Mixing		Profiles, Complete Wings	
Laminar Flow		Surface Conditions, Complete Wings	
Turbulent Flow		Sweep, Complete Wings	
		Taper and Twist, Complete Wings	
W		Wings, Vibration and Flutter	(4.2.1)
		Wings	(1.2)
		See also	
Wake, Complete Wings	(1.2.2.7)	Wing Sections	
Wake, Wing Sections	(1.2.1.9)	Wings, Complete	
Wind Tunnels	(9.1.1)	Wings and Tails, Ice Prevention and Removal	(7.3.3)
Windshields Ice Prevention and Removal	(7.3.4)	Wings, Complete	(1.2.2)
Wing-Body Combinations, Missiles	(1.7.2.1.1)	See also	
Wing-Fuselage Combinations, Airplanes	(1.7.1.1.1)	Boundary Layer, Complete Wings	
Wing Loads		Controls, Complete Wings	
See		High-Lift Devices, Complete Wings	
Loads, Wing		Mach Number Effects, Complete Wings	
Wing-Nacelle Combinations, Airplanes	(1.7.1.1.2)	Reynolds Number Effects, Complete Wings	
Wing-Section Theory	(1.2.1.1)	Wake, Complete Wings	
Wing Sections	(1.2.1)	Wing Theory, Complete Wings	
See also		Wing Variables, Complete Wings	
Boundary Layer, Wing Sections		Woods	(5.1.7)
Controls, Wing Sections			
Designated Profiles, Wing Sections			
High-Lift Devices, Wing Sections			
Mach Number Effects, Wing Sections			
Reynolds Number Effects, Wing Sections			
Section Variables, Wing Sections			
Wake, Wing Sections			
Wing-Section Theory			
		Y	
		Yaw and Pitch, Propellers	(1.5.2.9)



AUTHOR INDEX

## A

Abbott, Frank T., Jr., 108  
 Adams, James J., 14, 28, 97, 147  
 Aiken, William S., Jr., 76  
 Alexander, Sidney R., 3, 16(2), 26  
 Alford, William J., Jr., 15, 23, 28, 30  
 Allen, Edwin C., 43  
 Allen, Hubert W., 3(2)  
 Allis, Arthur E., 62  
 Amer, Kenneth B., 3, 80  
 Anderson, Roger A., 150  
 Anderson, Seth B., 20, 29, 36  
 Anderson, Warren E., 57  
 Anderson, William J., 131(2)  
 Angle, Ellwyn E., 90  
 Ankenbruck, Herman O., 76  
 Armstrong, John C., 120, 122  
 Arne, Vernon L., 3  
 Ashkenas, Harry, 1  
 Assadourian, Arthur, 97  
 Axelson, John A., 4  
 Axilrod, Benjamin M., 157

## B

Bailey, Frederick J., Jr., 5  
 Baker, John E., 7, 62  
 Bandettini, Angelo, 32  
 Bandish, Rozalia M., 23  
 Barclay, F. Dorn, 53  
 Barling, Walter H., Jr., 47  
 Barlow, William H., 82  
 Barnes, Robert H., 36  
 Barson, Zelmar, 123  
 Barzelay, Martin E., 151  
 Bates, William R., 51, 69  
 Baughman, L. Eugene, 46, 56  
 Beam, Benjamin H., 91  
 Beard, Luther, Jr., 32  
 Becht, Robert E., 25(4), 26, 27(2), 29  
 Beck, Paul A., 156  
 Becker, R., 13  
 Beckhardt, Arnold R., 45  
 Beckwith, Ivan E., 7  
 Beeler, De Elroy, 42, 74  
 Belles, Frank E., 124  
 Bellman, Donald R., 43, 125  
 Bennett, Charles V., 74, 75  
 Berggren, Robert E., 22(2)  
 Berlad, Abraham L., 124(2)  
 Berman, Julian H., 26  
 Berman, Theodore, 104  
 Bernstein, Harry, 6  
 Bingham, Gene J., 55, 56  
 Bird, John D., 92, 93  
 Bisson, Edmond E., 131  
 Bittker, David A., 126  
 Blackaby, James R., 53  
 Bland, William M., Jr., 94

Blatz, Robert E., 12  
 Bobbitt, Percy J., 7  
 Boddy, Lee E., 27  
 Boeckh, 146  
 Boegli, J. S., 133  
 Bonneville, J. M., 131  
 Booth, Robert A., 21  
 Boswinkle, Robert W., Jr., 16  
 Bowden, Dean T., 12  
 Boyd, John W., 21(2)  
 Brajnikoff, George B., 53(2), 55, 56  
 Branstetter, J. Robert, 125  
 Bray, Richard S., 29(2), 75  
 Brevoort, Maurice John, 4, 6, 7  
 Brightwell, Virginia L., 80  
 Brinich, Paul F., Jr., 7  
 Bromm, August F., Jr., 6(2)  
 Brooks, George W., 67(3)  
 Brooks, William A., Jr., 150  
 Brown, Beverly Porter, 35(2), 74, 174  
 Brown, Clinton E., 22  
 Brown, Harold A., 176  
 Brown, Harvey H., 34, 39  
 Brown, Stuart C., 76  
 Brown, W. Byron, 120  
 Brun, Rinaldo J., 16, 77(2)  
 Bryant, Robert L., 25, 91  
 Buchele, Donald R., 182  
 Budiansky, Bernard, 21, 145, 150  
 Buell, Donald A., 64  
 Burk, Sanger M., Jr., 38, 104  
 Bursnall, William J., 8  
 Butler, Roger V., 112  
 Byrnes, Andrew L., Jr., 15

## C

Cahill, Jones F., 17, 33, 92  
 Callaghan, Edmund E., 59, 123  
 Campbell, George S., 21, 41  
 Campbell, John P., 87  
 Canning, Thomas N., 39, 46(2)  
 Cannon, Michael D., 62  
 Carmel, Melvin M., 63(2)  
 Carroll, Raymond B., 9, 58  
 Carroll, Robert W., 60  
 Carros, Robert J., 6  
 Carter, Arthur W., 112  
 Caywood, William C., 120  
 Chambliss, Derrick B., 113  
 Chapman, Dean R., 2, 16, 17  
 Charters, Alex C., Jr., 90  
 Chauvin, Leo T., 3, 12, 78  
 Cheesman, Gail A., 17  
 Chiarito, Patrick T., 21  
 Chilton, Robert G., 91, 174  
 Christopher, Kenneth W., 114(2)  
 Clagett, Harry P., 76  
 Clark, Thomas P., 124, 126  
 Cleary, Joseph W., 21, 34



Clevenson, Sherman A., 145, 147  
 Clousing, Lawrence Adrian, 34, 39  
 Coale, C. W., 145  
 Coffin, Kenneth P., 124  
 Cohen, Clarence B., 2(2)  
 Cohen, Doris, 7  
 Cohen, Nathaniel B., 8  
 Cole, Isabella J., 6  
 Cole, Richard I., 49  
 Coleman, Thomas L., 142(2)  
 Coles, Willard D., 12, 59  
 Coletti, Donald E., 6  
 Colner, William H., 155  
 Comisarow, Paul, 26  
 Connors, J. F., 55  
 Cook, Francis E., 145  
 Cooney, T. V., 76, 77  
 Cooper, George E., 36, 75, 76  
 Cooper, Morton, 6  
 Copp, Martin R., 55, 142  
 Coppolino, Domenic A., 63  
 Corrsin, Stanley, 1(2)  
 Costello, George R., 8  
 Crane, Harold L., 14, 28, 34, 35, 45  
 Creer, Brent Y., 92  
 Crigler, John L., 62  
 Crim, Almer D., 67, 81  
 Critzos, Chris C., 16  
 Croom, Delwin R., 33, 37  
 Cummings, John L., 5, 46  
 Cunningham, Herbert J., 1, 30  
 Curfman, Howard J., Jr., 16, 92  
 Czarnecki, Kazimierz Roman, 5(2), 6, 8(2)

## D

Daley, Bernard N., 3, 4  
 Danforth, Edward C. B., 3d., 3, 4, 21, 50, 176  
 Dannenberg, Robert E., 8, 16, 17  
 Davenport, Edwin E., 32(2)  
 Davids, Joseph, 55  
 Davidson, Robert E., 62(2)  
 Davis, Wallace Frederick, 53, 56  
 Dawson, John Robert, 113  
 Deissler, Robert G., 11, 133  
 Delano, James B., 62(2), 63(2)  
 Delany, Noel K., 32(2), 53  
 Delio, Gene J., 122  
 DeMoraes, Carlos A., 12, 50  
 Denardo, Billy Pat, 39  
 Dennis, David H., 5  
 DeRocher, Wilfred L., Jr., 121  
 Deutsch, George C., 156  
 Dewey, Paul E., 54(2)  
 DeYoung, John, 47  
 Dhawan, Satish, 1  
 Diaguila, Anthony J., 11  
 Dick, Richard S., 4  
 Diederich, Franklin Wolfgang, 86, 145  
 Diederich, Margaret S., 21

Dieter, George Ellwood, Jr., 155  
 Dietz, Albert E., 22  
 Dietz, O., 146  
 Dingeldein, Richard C., 67  
 Dittrich, Ralph T., 124  
 Dods, Jules B., Jr., 30  
 Donaldson, Coleman duPont, 2, 9  
 Donegan, James J., 91  
 Donlan, Charles J., 71  
 Donoughe, Patrick L., 8, 11, 12  
 Döring, Werner, 13  
 Dorsch, Robert G., 77(2)  
 Dosanjh, Darshan Singh, 177  
 Douglass, Howard W., 124(2)  
 Dow, Norris F., 151  
 Drake, Hubert M., 74(4), 75, 76  
 Drake, Wray V., 131  
 Draper, John W., 32(4), 72  
 Drell, Isadore L., 131  
 DuBois, George B., 131(2)  
 Dugan, Duane W., 4, 22  
 Dugger, Gordon L., 124  
 Dumas, R., 9, 10  
 Dunning, Robert W., 4, 24

## E

Eaton, I. D., 151  
 Eckert, Ernst Rudolf Georg, 11(2), 12  
 Edge, Philip M., Jr., 145  
 Edmondson, James L., 15, 22(2)  
 Eggers, A. J., Jr., 5  
 Eggleston, John M., 75, 76  
 Ellis, Macon C., Jr., 5  
 Elwell, Fred S., 170  
 Engel, Jerome N., 142  
 Erickson, Albert L., 25  
 Ernst, Edward A., 36  
 Esgar, Jack B., 120  
 Eubanks, A. G., 157  
 Evans, Albert John, 6, 62(3)  
 Evvard, John C., 58

## F

Faber, Stanley, 28, 91  
 Faget, Maxime A., 58  
 Farmer, James Elmo, 129  
 Favre, Alexandre, 9, 10  
 Feiler, Charles E., 125  
 Fenn, David B., 55  
 Fenn, Virginia O., 124  
 Ferrari, Carlo, 7  
 Ferri, Antonio, 53  
 Few, Albert G., Jr., 25(3), 26, 27  
 Fields, Edison M., 35  
 Fieno, Daniel, 121  
 Fikes, Joseph E., 28, 29(2), 30(2), 33, 36

Fink, Marvin P., 28  
 Fischel, Jack, 25, 32, 37  
 Fisher, Lewis R., 73  
 Fletcher, Herman S., 73  
 Flügge, Wilhelm, 145  
 Fontana, Rudolph E., 23  
 Forestieri, Americo F., 160  
 Forsyth, Charles M., 74  
 Foss, Kenneth A., 86  
 Foster, John V., 176  
 Fournier, Paul G., 23(3)  
 Fox, Jerome L., 5  
 Francis, Howard T., 155  
 Francisco, Allen C., 151  
 Frank, Joseph L., 53, 54  
 Frazer, Alson C., 57  
 Freche, John C., 129  
 Freeman, James W., 155  
 Frenkel, Ya I., 158  
 Frick, Charles W., 21(2)  
 Fricke, Clifford L., 12  
 Friedman, Morris D., 7  
 Fryer, Thomas B., 93  
 Fuller, Franklyn B., 7, 22  
 Fung, Yuan-Cheng, 150  
 Funk, Jack, 30  
 Furlong, G. Chester, 27

## G

Gale, Lawrence J., 2, 49, 72, 75  
 Gallagher, Helen M., 16  
 Gambucci, Bruno J., 8  
 Gardner, William N., 16, 45  
 Garrett, Floyd B., 55, 120(3), 156  
 Gates, Ordway B., Jr., 78  
 Gaviglio, J., 9, 10  
 Gelder, Thomas F., 16  
 George, Desmond A., 157  
 Germain, Paul, 7  
 Gerstein, Melvin, 125  
 Gessow, Alfred, 67(3)  
 Gilman, Jean, Jr., 62(3)  
 Glawe, George E., 161  
 Godfrey, Douglas, 131  
 Goin, Kenneth L., 6, 33  
 Gold, Harold, 121, 122  
 Goldstein, Arthur W., 7  
 Goldstein, David L., 56  
 Gomberg, Henry J., 155  
 Goodman, Harold R., 36, 74  
 Goodson, Kenneth W., 21, 27(3)  
 Goodwin, Julia M., 7  
 Goodwin, Roscoe H., 49, 68  
 Görtler, Henry, 8  
 Gottlieb, Stanley M., 100  
 Gould, Lawrence I., 56  
 Gracey, William, 176

Graham, Donald J., 16  
 Grala, E. M., 156  
 Grant, Frederick C., 6  
 Grape, Richard G., 2  
 Graves, Charles C., 125  
 Gray, Lyle J., 34  
 Gray, Vernon H., 12  
 Gray, Wilbur H., 62(2), 64  
 Gregg, John L., 5  
 Griffith, John H., 43  
 Grigsby, Carl E., 5  
 Grover, Horace John, 155  
 Gundzik, Richard M., 125  
 Gyorgak, Charles A., 120, 151, 156(2)

## H

Habel, Louis W., 20  
 Hadlock, Ivan K., 142  
 Haefeli, Rudolph C., 5, 6  
 Hagerman, John R., 27, 29, 35  
 Hagginbothom, W. K., 59  
 Hall, Albert W., 15(2), 24, 28  
 Hall, Charles F., 53(2)  
 Hamaker, Frank M., 7  
 Hamilton, Clyde V., 6  
 Hammond, Alexander D., 30(2), 32, 35(2), 36  
 Hamrick, Joseph T., 2  
 Hansen, Arthur G., 8  
 Hardrath, Herbert F., 152  
 Harling, R., 146  
 Harp, James L., Jr., 120  
 Harper, Paul W., 68  
 Harrington, Robert D., 51  
 Harrison, Daniel E., 62, 63  
 Harrison, William N., 156(2)  
 Hart, H. A., 62  
 Hart, Roger G., 50  
 Hartmann, E. C., 151  
 Hasel, Lowell E., 6  
 Hassell, James L., Jr., 92  
 Hayes, William C., 49  
 Hayter, Nora-Lee F., 29, 32(2)  
 Hazen, Marlin E., 67  
 Heaslet, Maxwell Alfred, 7, 22  
 Heath, Atwood R., Jr., 148  
 Hedgepeth, John M., 46  
 Heimerl, George J., 155  
 Heinle, Donovan R., 31  
 Heitkotter, Robert H., 121  
 Hemenover, Albert D., 16  
 Henderson, Arthur, Jr., 7  
 Henney, Floyd W., 14  
 Hennings, Glen, 121  
 Hermann, R., 133  
 Herzig, Howard Z., 3, 8  
 Heyson, Harry H., 16, 47  
 Hibbard, Robert R., 124  
 Hikido, Katsumi, 22



Hill, Paul R., 80, 90  
 Hiller, Kirby W., 122  
 Hilton, John H., Jr., 6, 8  
 Hipsher, Harold F., 124  
 Hofstetter, Robert U., 179  
 Holleman, Euclid C., 90  
 Holloway, George F., 151  
 Holt, Marshall, 151  
 Holzhauser, Curt A., 49, 54, 56(2)  
 Hood, Richard, 122  
 Hopkins, Edward J., 7  
 Horne, G. T., 155  
 Horne, Walter B., 145, 146  
 Houbolt, John C., 146  
 Howell, Robert R., 54  
 Howes, Walton L., 182  
 Hubbard, Harvey H., 11, 62, 80  
 Hubbartt, James E., 3  
 Hughes, Philip J., 155(2)  
 Hultz, Burton E., 38  
 Humphrey, Jack C., 125  
 Humphreys, Milton D., 4(4), 14  
 Hunczak, Henry R., 11  
 Hunt, Robert M., 62  
 Huppert, Merle Cecil, 121  
 Hyler, Walter S., 155

## I

Igoe, William B., 62  
 Illg, Walter, 152  
 Inge, John E., 155  
 Ingebo, Robert D., 133  
 Intrater, J., 155(2)

## J

Jack, John R., 8  
 Jackson, H. Herbert, 6, 78  
 Jackson, Joseph L., 124  
 Jacques, James R., 121  
 Jagger, James M., 5(2)  
 James, Carlton S., 6  
 Jaquet, Byron M., 23, 25, 29  
 Jedlicka, James R., 6  
 Johnson, Aldie E., Jr., 150, 157(2)  
 Johnson, Harold I., 23, 31, 35(2), 36, 37  
 Johnson, Harold S., 35(2), 49  
 Johnson, Joseph L., Jr., 30, 33, 34, 47, 73  
 Johnson, Peter J., 62  
 Johnson, R. D., 155  
 Johnson, Robert L., 131(4)  
 Johnston, J. Ford, 3(2)  
 Jonash, Edmund R., 124  
 Jones, Ira P., Jr., 75, 84  
 Jordan, Gareth H., 21  
 Joyner, Upshur Tucker, 145

## K

Kaplan, A., 150  
 Kaplan, Carl, 2(2), 3  
 Katz, Ellis R., 17, 23, 51  
 Katz, N. H., 156  
 Katzen, Elliott D., 21  
 Kaufman, Albert, 120  
 Kaufman, Samuel J., 121  
 Keener, Earl R., 23(3)  
 Keith, Arvid L., Jr., 30, 55, 56  
 Kell, Robert J., 46  
 Kelly, John A., 7, 17, 29  
 Kemp, William B., Jr., 21, 23, 25(3), 26  
 Kennedy, Robert M., 28, 72(3)  
 Kennedy, Thomas L., 80, 90  
 Kent, John D., 4  
 Kester, Robert H., 16  
 Keune, Friedrich, 14  
 King, Douglas A., 114, 116  
 King, Thomas J., Jr., 25, 27(2), 31, 41  
 Kirkpatrick, H. B., 156  
 Kistler, Alan L., 1  
 Klebanoff, Philip Samuel, 10  
 Klinar, Walter J., 84  
 Knechtel, Earl D., 28  
 Kochendorfer, Fred D., 5  
 Kofskey, Milton G., 3(2)  
 Kolk, W. Richard, 24, 73  
 Kordes, Eldon E., 147  
 Kotanchik, Joseph N., 21  
 Kraft, Christopher C., Jr., 47, 97  
 Kramer, James J., 1(2)  
 Kranz, M., 145  
 Krebs, Richard P., 80  
 Kremzier, Emil J., 55  
 Krumm, Walter J., 24  
 Kruszewski, Edwin T., 147  
 Kuehn, Donald M., 179  
 Kuhn, Richard E., 27(2), 32(4), 35, 73  
 Kuhns, Perry W., 121  
 Kurbjun, Max C., 31, 51, 64  
 Kyle, James C., 21

## L

Ladanyi, Dezso Joseph, 121  
 Lamneck, John H., Jr., 124  
 Land, Norman Stafford, 108, 113, 116  
 Lange, Roy H., 28, 35  
 Lanzo, Chester D., 123  
 Lassiter, Leslie W., 11, 62, 80, 121  
 Lauten, William T., Jr., 2, 69  
 Lawrence, Leslie F., 71  
 Lazar, James, 121  
 Leonard, Robert W., 145  
 Lessing, Henry C., 93  
 Letko, William, 27, 50

Levy, Lionel L., Jr., 28  
 Lewis, R. A., 155  
 Lichtenstein, Jacob H., 23  
 Liddell, Charles J., Jr., 92  
 Liepmann, Hans Wolfgang, 8  
 Lietzke, Armin F., 133  
 Lilly, Howard C., 82  
 Lina, Lindsay John, 4, 26, 176(2)  
 Lindquist, Dean C., 139, 145  
 Lindsey, Walter Frank, 5  
 Liner, George, 62  
 Lipsitt, H. A., 155  
 Livingood, John N. B., 8, 11, 12  
 Lockwood, Vernard E., 18, 27, 28(2), 29, 30(2),  
 33, 35(2), 36  
 Loftin, Laurence K., Jr., 14, 15(2), 17  
 Lomax, Harvard, 22(2), 142  
 Long, Roger A., 129, 155  
 Look, Bonne C., 28  
 Lopatoff, Mitchell, 3, 4  
 Lopper, J. Dan, 1, 9, 10  
 Lord, Albert M., 125  
 Lord, Douglas R., 3  
 Love, Eugene S., 4, 6, 22  
 Loving, Donald L., 74  
 Low, George M., 2  
 Lowdermilk, Warren H., 133  
 Lowry, John G., 29  
 Lubarsky, Bernard, 121  
 Luchuk, Wallace, 62  
 Lundstrom, Reginald R., 1, 168  
 Luoma, Arvo A., 25

## M

## Mc and Mac

Surnames beginning with Mc or Mac are all  
 filed as if spelled Mac.

McCarty, John Locke, 67  
 McComb, Harvey G., Jr., 150, 151  
 McCullough, George Burns, 7, 17  
 McDevitt, John B., 4(2), 24  
 McDonald, Glen E., 124(2)  
 McEvily, Arthur J., Jr., 155(2)  
 McFadden, Norman M., 29  
 McFall, John C., Jr., 52  
 McGehee, John R., 112  
 McKay, James M., 15, 24, 28, 40, 43  
 McKinney, Marion O., Jr., 32  
 McKinnon, Roy A., 12  
 Macks, Elmer Fred, 131  
 McLaughlin, Milton D., 34, 68  
 McLellan, Charles Herbert, 6  
 McLemore, Huel Clyde, 62  
 MacLeod, Richard G., 29, 36, 50  
 MacNeal, Richard H., 151  
 McNeill, Walter E., 76  
 Maki, Ralph L., 33  
 Male, Theodore, 125

Malick, Alexander W., 32, 34, 37  
 Mandel, J., 157  
 Manson, Samuel S., 129, 156  
 Margolis, Kenneth, 6, 7  
 Marte, Jack E., 8  
 Martin, Andrew, 21  
 Martin, John C., 1  
 Martin, Norman J., 57(2)  
 Martina, Albert P., 22, 29  
 Maslen, Stephen H., 11  
 Mason, Homer P., 45  
 Mathauser, Eldon E., 150, 151  
 Matheny, Cloyce E., 45  
 Mathews, Charles W., 1, 3, 15, 74, 97  
 Matthews, Clarence W., 2  
 Matthews, James T., Jr., 40, 74, 75  
 Mattson, Axel T., 39, 74  
 Maxwell, William A., 155, 156(2)  
 Mayer, John P., 3, 74  
 Mayers, J., 150  
 Maynard, Julian D., 62  
 Mazelsky, Bernard, 142  
 Mead, Merrill H., 93  
 Meadows, May T., 142  
 Mehl, Robert Franklin, 155  
 Melzer, M., 146  
 Mendelson, Alexander, 60  
 Merlet, Charles F., 53  
 Metzger, M., 155(2)  
 Meyer, André J., Jr., 120  
 Michael, William H., Jr., 22  
 Mickleboro, Harry C., 30  
 Mickley, H. S., 1  
 Miele, Angelo, 77  
 Migotsky, Eugene, 2  
 Millenson, Morton B., 129  
 Miller, Riley O., 121  
 Milling, Robert W., 63  
 Milwitzky, Benjamin, 139, 145  
 Mirels, Harold, 5(2), 9, 46  
 Mitcham, Grady L., 69  
 Mitchell, Jesse L., 176  
 Moeckel, Wolfgang E., 4, 55  
 Molk, Ashley J., 55  
 Moore, Dwight G., 156(2), 157  
 Moore, Franklin K., 2, 11  
 Moore, John A., 7  
 Mordfin, Leonard, 150  
 Morduchow, Morris, 2  
 Morgan, Francis G., Jr., 62, 63  
 Morgan, William C., 120  
 Morris, Garland J., 15, 28, 29, 72(2), 176  
 Morrison, William D., Jr., 23(3), 27(2), 41  
 Morrow, John D., 17(2)  
 Morse, C. Robert, 120  
 Moseley, William C., Jr., 25, 30, 33  
 Moskowitz, Barry, 8  
 Mossman, Emmet A., 54  
 Mottard, Elmo J., 1  
 Mueller, James N., 5(2)  
 Mungall, Robert G., 31



Murphy, Maurice P., 62  
 Murray, S. F., 131(2)  
 Myers, Boyd C., 2d., 27(4), 35, 41, 42

## N

Naeseth, Rodger L., 51  
 Nason, Martin L., 78  
 Neel, Carr B., Jr., 165(2)  
 Neihouse, Anshal I., 29  
 Nelson, Herbert C., 26  
 Nelson, Robert L., 26  
 Nelson, Walter C., 78  
 Nelson, Warren Howard, 24(2), 25  
 Nelson, William J., 54  
 Nemeth, Zolton N., 131(2)  
 Nichols, Mark R., 54  
 Nielsen, Helmer V., 6  
 Nitzberg, Gerald E., 7  
 North, Warren J., 123  
 Nuber, Robert J., 17  
 Nucci, Louis M., 5, 53

## O

Oberndorfer, Gale C., 33  
 O'Brien, Vivian, 1  
 O'Bryan, Thomas C., 4, 71, 176(2)  
 Ocvirik, Fred W., 131(2)  
 O'Hare, William M., 27, 37, 76  
 O'Kelly, Burke R., 168  
 Olson, Robert N., 71  
 O'Neal, Cleveland, Jr., 124  
 Oppenheimer, Frank L., 121  
 Osborne, Robert S., 5  
 Otto, Edward W., 122

## P

Pack, George J., 120  
 Page, William A., 16  
 Pappas, Constantine C., 6  
 Paradiso, Nicholas J., 16, 29  
 Pasamanick, Jerome, 28  
 Passera, Anthony L., 78(3)  
 Pasteur, Thomas B., Jr., 41  
 Paulson, John W., 30  
 Pearson, Albin O., 176(2)  
 Peck, Robert F., 51, 176  
 Peele, James R., 23  
 Pendley, Robert E., 53(2)  
 Peres, M. J., 7  
 Perkins, Edward W., 46(2)  
 Pesman, Gerald J., 120  
 Peters, Max D., 80  
 Peters, Roger W., 151  
 Peterson, James P., 150  
 Peterson, Marshall B., 131

Petynia, William W., 113  
 Phelps, E. Ray, 4  
 Phillips, William E., Jr., 122  
 Phillips, William H., 147  
 Pierce, Mary, 23  
 Pierpont, P. Kenneth, 54(2)  
 Pinkel, Benjamin, 156  
 Pinkel, I. Irving, 5, 120  
 Pitkin, Marvin, 16  
 Pittel, Murray, 21  
 Pitts, Joseph W., 156  
 Platt, Robert J., Jr., 63(2)  
 Polhamus, Edward C., 2, 22, 25, 29, 31, 41, 75  
 Potter, A. E., Jr., 124  
 Potter, Dexter M., 139, 145  
 Powell, Robert D., Jr., 17  
 Prasse, Ernst I., 11  
 Press, Harry, 46, 142(2), 146  
 Preston, George Merritt, 120  
 Prosser, Stanley B., 155  
 Pumphrey, Norman E., 72

## Q

Queijo, Manuel J., 68

## R

Racisz, Stanley Frank, 29  
 Rainey, A. Gerald, 26, 30  
 Rainey, Robert W., 4  
 Rainey, Ruby A., 26  
 Ramsen, John Albert, 17, 26, 50, 53  
 Rashis, Bernard, 6, 7  
 Rathert, George A., Jr., 29, 34, 36, 54  
 Rayle, Warren D., 124  
 Reed, James F., 21  
 Reed, Verlin D., 32  
 Reed, Wilmer H., 3d., 4  
 Reese, James R., 74  
 Regier, Arthur A., 7  
 Reller, John O., Jr., 7  
 Rennemann, Conrad, Jr., 7  
 Reshotko, Eli, 2(2), 7  
 Resnikoff, Meyer M., 5, 6  
 Reynolds, Robert M., 55, 64  
 Ribner, Herbert Spencer, 6(2)  
 Richmond, Joseph C., 156  
 Riddell, Frederick Raymond, 1  
 Rideout, Sheldon Paul, 156  
 Riebe, John M., 50, 51  
 Rightmire, Brandon Garner, 131  
 Riley, Donald R., 68(2)  
 Ritchie, Virgil S., 2  
 Robards, Chester F., 120  
 Robinson, Harold L., 46, 53(2)  
 Robinson, Ross B., 8  
 Rockett, John A., 114  
 Roden, William S., 75, 76

Rodert, Lewis August, 55  
 Rogallo, Vernon L., 64  
 Rogers, Arthur William, 1  
 Rohlik, Harold E., 3  
 Rolls, L. Stewart, 36, 39, 54  
 Rosecrans, Richard J., 151  
 Rosenzweig, Solomon, 121  
 Roshko, Anatol, 1(2)  
 Ross, Albert O., 121  
 Ross, R. C., 1  
 Rouso, Morris D., 5, 11  
 Rubesin, Morris W., 7, 10  
 Rubin, Arnold J., 55  
 Rumsey, Charles B., 3, 7, 9, 78  
 Runyan, Harry L., 148  
 Russell, Walter R., 176

## S

Sabol, Alexander P., 181  
 Sacks, Alvin H., 22  
 Sadoff, Melvin, 38, 75(2), 76(2)  
 Sammonds, Robert I., 55(2)  
 Sams, Eldon W., 13  
 Sandahl, Carl A., 24, 34, 94(2)  
 Sandborn, Virgil A., 3, 10, 11  
 Sanders, E. Claude, Jr., 22  
 Sanders, John C., 80  
 Sargent, Arthur F., Jr., 123  
 Savin, Raymond C., 7  
 Sawyer, Richard H., 15, 26, 28  
 Schade, Robert O., 92  
 Schafer, Louis J., Jr., 120  
 Schalla, Rose L., 124(2)  
 Scher, Stanley H., 49(3), 82, 109(2)  
 Scherrer, Richard, 21  
 Schiff, Jack, 30  
 Schlaefke, Karlhans, 145  
 Schlechte, Floyd R., 151  
 Schmidt, Stanley F., 103  
 Schneiter, Leslie E., 35  
 Schnitzer, Emanuel, 81  
 Schwartz, Ira R., 9  
 Schwartzberg, Milton Allen, 31  
 Schwent, Glennon V., 122  
 Schwope, A. D., 155  
 Schy, Albert A., 78  
 Seaberg, Ernest C., 78, 90(2), 92  
 Sears, R. I., 53  
 See, John A., 76  
 Seiff, Alvin, 6(2)  
 Sellers, Thomas B., 28  
 Semonian, Joseph W., 150(2)  
 Serafini, John S., 5, 16  
 Sewall, John L., 74  
 Shepard, Charles E., 2, 161  
 Shillito, Thomas B., 120  
 Shinbrot, Marvin, 90  
 Short, Barbara J., 7  
 Shufflebarger, Charles C., 46  
 Shuford, Charles L., Jr., 23, 112(2), 114(3)  
 Shumaker, Robert A., 63  
 Sikora, Paul F., 120  
 Silhan, Frank V., 53  
 Silsby, Norman S., 29, 40, 43, 72(2), 145  
 Silvers, H. Norman, 24, 39, 71  
 Simmons, Frederick S., 1, 12  
 Simon, Dorothy Martin, 124  
 Sinclair, Archibald R., 6  
 Sisk, Thomas R., 38, 75(2)  
 Skinner, George Tolmie, 8  
 Sleeman, William C., Jr., 27(3)  
 Slogar, Raymond J., 3, 11  
 Slone, Henry O., 3  
 Sluder, Loma E., 22  
 Smiley, Robert F., 146  
 Smith, Charles C., Jr., 50  
 Smith, Earl F., 78  
 Smith, Francis B., 12  
 Smith, G. Allan, 28  
 Smith, Kenneth J., 2  
 Smyers, William H., Jr., 16  
 Solomon, George E., 4  
 Solomon, Joseph, 14  
 Solomon, Martin, 30  
 Solomon, William, 64  
 Sommer, Simon C., 5, 7  
 Sorenson, Robert M., 21  
 Spangenberg, Wesley G., 177  
 Sparrow, E. M., 9  
 Spearman, M. Leroy, 26, 39  
 Spiegel, Joseph M., 6, 56, 179  
 Spreemann, Kenneth P., 23, 24, 28, 30, 39, 41  
 Spreiter, John R., 2  
 Squyers, A. L., 1  
 Stalder, Jackson R., 6  
 Stanitz, John D., 1(2)  
 Stark, James A., 5  
 Steinberg, Seymour, 20, 63  
 Stephenson, Bertrand H., 146  
 Stepka, Francis S., 120  
 Sterbentz, William H., 55, 58  
 Sterrett, James R., 4  
 Stevens, George L., 21  
 Stevens, Kenneth N., 170  
 Stewart, W. E., 1  
 Stine, Howard A., 8  
 Stivers, Louis S., Jr., 32(2), 34, 37, 42  
 Stokes, Fred H., 97  
 Stone, David G., 94  
 Stone, Ralph W., Jr., 91  
 Stoney, William E., Jr., 51  
 Strass, H. Kurt, 35(2)  
 Stricker, Edward G., 124  
 Summers, James L., 16, 22  
 Swett, Clyde C., Jr., 127  
 Swihart, John M., 66  
 Swikert, Max A., 131(2)  
 Sylvester, Maurice A., 2, 67(2)  
 Szczeniowski, Boleslaw, 11



## T

Talbot, L., 7  
 Tapscott, Robert J., 67  
 Taylor, Maynard F., 11  
 Taylor, Robert A., 4, 54(2)  
 Teitelbaum, Jerome M., 92  
 Theisen, Jerome G., 145  
 Thibodaux, J. G., 59  
 Thompson, Jim Rogers, 1, 3(2), 15, 51, 75(2)  
 Thompson, Robert F., 27, 30, 35, 42  
 Tinling, Bruce E., 24, 73  
 Toll, Thomas A., 87  
 Tong, Kin Nee, 151  
 Tosti, Louis P., 32(2)  
 Towe, George C., 155  
 Trant, James P., Jr., 38, 105, 176  
 Trimpi, Robert L., 2(2), 8  
 Triplett, William C., 28, 42, 76, 103  
 Truckenbrodt, Erich, 9  
 Tucker, Maurice, 7, 13  
 Tucker, Warren A., 15, 21  
 Tulin, Marshall P., 1, 2  
 Tunnell, Phillips J., 6  
 Tuovila, Weimer J., 7  
 Turner, Howard L., 90  
 Turner, Thomas R., 18, 27, 28, 33, 35, 36(2), 41

## U

Uberoi, Mahinder S., 1  
 Ulmann, Edward F., 5, 24  
 Underwood, William J., 17  
 Useller, James W., 120

## V

Valentine, Edwin Floyd, 9, 55, 58  
 Valentine, George M., 74  
 Van Dyke, Milton Denman, 1, 3  
 Van Dyke, Rudolph D., Jr., 36, 42, 90, 92  
 Varga, Steven A., 7  
 Vasu, George, 120  
 Vaughan, Victor L., Jr., 17, 26  
 Vick, Allen R., 53  
 Vincenti, Walter G., 4(2)  
 Vitale, A. James, 46  
 Vogeley, Arthur William, 62, 64  
 Vogler, Raymond D., 18, 27, 35(2), 36  
 Voglewede, Thomas J., 5  
 Vogt, Dorothea E., 16  
 von Doenhoff, Albert E., 14  
 Von Glahn, Uwe H., 12, 16

## W

Wadlin, Kenneth L., 23, 53, 112, 113  
 Wagoner, Cleo B., 4

Walker, Curtis L., 55  
 Walker, Harold J., 22, 32, 42  
 Walker, John H., 64  
 Walker, Walter G., 142(3)  
 Wallner, Lewis E., 55  
 Walls, James H., 145, 146  
 Waner, Paul G., Jr., 46  
 Wanlass, Kent, 8  
 Wasserman, Robert, 7  
 Watkins, Charles E., 26, 148  
 Watson, James M., 25(3), 30(3)  
 Wear, Jerrold D., 120, 124(2)  
 Weeton, John Waldemar, 120  
 Wehe, R. L., 131  
 Weiberg, James A., 8, 16, 17  
 Weil, Joseph, 21, 27, 39  
 Weiland, Walter F., Jr., 13, 133  
 Weinflash, Bernard, 114(4)  
 Weinstein, Maynard I., 56  
 Welsh, Clement J., 15, 50  
 Weltmann, Ruth N., 124  
 Westmoreland, J. C., 136  
 Whitcomb, Richard Travis, 21, 28(2), 62  
 White, John S., 90  
 White, Maurice Donald, 28  
 Whitten, James B., 97  
 Wick, Bradford H., 14  
 Widmayer, Edward, Jr., 145  
 Wier, John E., 157  
 Wiggins, James W., 42, 73  
 Wilcox, Ward W., 128  
 Wiley, Harleth G., 30, 36, 37(2)  
 Wilkins, Max E., 6  
 Wilks, I. Edward, 150  
 Williams, Claude V., 53  
 Williams, Thomas W., 6  
 Williams, Walter C., 74(4), 75  
 Wilson, Herbert A., Jr., 17  
 Wilson, Jack H., 75  
 Wilsted, H. Dean, 122  
 Wimbrow, William R., 21  
 Winograd, Lee, 36  
 Wintler, John T., 55  
 Wolhart, Walter D., 27  
 Wollner, Bertram C., 68  
 Wolock, Irvin, 157  
 Wood, Charles C., 3  
 Wood, John H., 66  
 Woodbridge, Julia B., 23  
 Woolley, Harold W., 11  
 Wright, John B., 5, 23, 25, 46, 68  
 Wright, Linwood C., 3  
 Wright, Ray H., 1, 2  
 Wyatt, DeMarquis D., 58  
 Wyss, John A., 21

## Y

Yaggy, Paul F., 64  
 Yaker, Charles, 120(2)

Yancey, Roxanah B., 74  
Yeates, John E., Jr., 5  
Yntema, Robert T., 80  
Young, A. P., 155

## Z

Zalovcik, John A., 15, 176  
Zarovsky, Jacob, 78  
Ziemer, Robert R., 120  
Zimmerman, Charles Horton, 90  
Zontek, Leon, 37